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VETERINARY MEDICINE

AUGUST 1944

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VOL. XXXIX
No. 8

Entered as second-class matter Nov. 8, 1920, at the post office at Chicago, Ill., under the Act of March 3, 1879.

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Chicago 49, U.S.A.

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- HOARD'S DAIRYMAN
- HOLSTEIN FRIESIAN WORLD
- JERSEY BULLETIN
- SHORTHORN WORLD

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Since 1935, research has resulted in the synthesis of more than 1300 new compounds derived from the parent sulfanilamide molecule.

Kline and Suessenguth, of Cleveland, reported, to the recent annual meeting of the Society of Clinical Pathologists in Chicago, that they have developed a simple blood test for trichinosis in man and swine that is efficient and accurate.

About five billion pounds of protein, somewhat over half of it animal protein, is produced for human consumption annually in the United States. One-third of the annual production is grain protein and one-sixth is vegetable proteins. Meat has not been replaced to any extent in the Army ration but sources of plant protein have been studied with a view to substituting them for a portion of the meat ration if such action becomes necessary.

Records of the Medical Department of the Army show that 70% of persons with uncomplicated gonorrhea are cured within five to seven days by one course of sulfathiazole (or sulfadiazine) treatment, and 10 to 15% respond to a second course of the same treatment. Virtually all of the remainder can be cured within 48 hours by the administration of penicillin. The supply of penicillin is inadequate for the treatment of other than the sulfonamide resistant cases. As late as 1937, cases of gonorrhea required, on the average, hospitalization for more than 50 days, and complications caused some disabling condition in 28% of the persons infected.

Persons with malnutrition have a number of deficiency diseases operating simultaneously. They recover much faster when all the deficiencies are recognized and treated.—Dr. Tom D. Spies, Hillman Hospital, Birmingham, Ala.

A single raid of a thousand 4-motored bombers over Berlin requires 800,000 gallons of gasoline—200 tank truck loads—enough to drive a passenger car 1000 years at 12,000 miles per year. And such raids, or raids of similar distances, are of daily occurrence.

A mechanized cavalry reconnaissance troop spent four months on daring day raids and night sorties in Sicily and Italy without a fatality among its nearly 200 men. This unparalleled good fortune is attributed to good leadership and thorough training. The troop not only obtained valuable information during its forays into enemy-held areas but captured a number of horses and mules which were put to use quickly by the American troops.

Penicillin is being manufactured by 13 American and two Canadian firms. By July 1st there were 21 licensed American firms producing it at full capacity. Approximately 86% of the production is allocated to the Army and Navy and even that does not equal their requirements. Penicillin is measured by an arbitrary standard of efficiency known as the Oxford unit—an amount of penicillin that completely inhibits the growth of *Staph. aureus* under specified conditions. More than 21 billion units were manufactured in 1943. Sufficient to treat an ordinary case at present costs about $35. A year ago it cost $200.

Rabies Prevalent in 1943

Rabies was more prevalent in 1943 than in any year since 1937 according to government reports. During the year there were 33 human deaths in the United States from the disease and 7,348 animals succumbed to it. For the first time in more than a decade the disease was prevalent in Washington, D. C.; being diagnosed in 104 dogs.

Deplorable as is the situation revealed by these reports, the real one is much worse, since reporting the disease in animals is largely on a voluntary basis and, particularly in animals other than the dog, is far from complete. Experience has shown repeatedly that rabies can be eradicated without difficulty from any country in which the dog is the sole natural reservoir of the infection—as is the case in this country.

★ ★ ★ BUY WAR ★ ★ ★
STAMPS AND BONDS

Gun-Shy Dogs

Researches, conducted by Arthur V. Jensen, at Cornell University, have determined that gun-shy dogs are neurotics. Subjected to a series of long term examinations, all gun-shy dogs studied were found to be timid, shy and extremely fearful. Their pulse rates, respiration, conditional reflexes and general behavior also were, without exception, abnormal. The tests indicated these animals lack nervous and emotional control which, the investigator believes, is the basic pattern of war neuroses in persons.

Doctor Jensen became able during this research to recognize a gun-shy dog just by looking at it and while a veterinarian, called upon only occasionally to examine dogs for sportsmen, may not be able to attain an equal degree of proficiency in detecting this fault, there are certain criteria that help in doing so. The pulse rate from 60 to 90 for normal dogs was increased to 150 to more than 200 in gun-shy dogs of similar size. They feared strange people and objects and when taken into a strange room did not exhibit the normal dog's curiosity. Exaggerated responses resulted when they were startled.

It is thought that this neurosis in dogs may be due to any of a variety of causes, most important of which are, faulty training of a young dog, heredity and abnormal functioning of the endocrine glands.

This research has been suspended since Doctor Jensen has entered the Army Air Forces as an aviation physiologist, where he will investigate the physiological and psychological response of aviators in high-altitude flying.

Equine Periodic Ophthalmia

Recent developments at the Army Veterinary Research Laboratory, Front Royal, Virginia, indicate significant progress toward the eventual control of equine periodic ophthalmia which is a recurrent iridocyclitis which has resulted in large losses in military animals. Since it is the most common cause of blindness in horses and mules, the disease is also a serious problem to civilian owners of such animals. Periodic ophthalmia is one of the oldest diseases of animals known. It was described by writers of the fourth century and discussed extensively in the writings of the eighteenth and nineteenth centuries. Research on this problem has been intensified in the past 10 years. For four years the Army Veterinary Research Laboratory at the Remount Depot, Front Royal, Virginia, has had this disease assigned as one of its projects. This work is carried on as part of the research and development program of the Medical Department.—*Bul. U. S. Army Med. Dept.* 71, p. 86, 1943.

Brucellosis Among Veterinarians

Ten per cent of all veterinarians in Switzerland acquired cutaneous lesions after obstetric interventions on animals infected with *Brucella abortus*. According to Schoch these lesions are due to an allergic reaction of the skin to contact with Brucella organisms. Acute brucellosis does not need to be present, because cutaneous lesions were seen not only in persons who had had brucellosis but in some who never had it. If the exanthems do not accompany acute brucellosis, the general condition may be good; fever and swelling of lymph nodes may be absent. The most frequent cutaneous manifestations are papulopustular eruptions and eruptions which resemble exudative erythema multiforme. The individual crop of efflorescences is rarely monomorphic; usually several forms concur. The differential diagnosis is difficult. Attempts to culture *Brucella* from cutaneous blisters may fail because pus organisms grow more rapidly and thus obscure the Brucella organisms. Subcutaneous inoculation into guinea pigs may yield the organism. Brucellosis can be ascertained by cutaneous reaction. In the presence of suspicious cutaneous lesions in persons who have aided in the delivery of animals with *Brucella abortus* the cutaneous test is more reliable than the blood agglutination test. Protection of hands and arms with oils or with rubber gloves and disinfection of hands are valuable prophylactic measures.—*Praxis* (Berne); Abst. in *J. Am. Med. Ass'n*, 125:6, p. 451, 1944.

Official U. S. Navy Photograph

PROVISIONS FOR UNITED NATIONS FORCES BEING LANDED ON THE BLEAK SHORES OF KISKA

Improvements in Food Packaging

The experience gained in packaging food and other materials for use of the Army in all parts of the world will no doubt modify the packaging of products for shipment in peacetime. At the outbreak of the war there was considerable loss particularly of food products sent to the South Pacific area and also to other tropical areas. With no harbor facilities, much of that destined for islands was loaded from ships on to rafts and floated to shore, often after being wet for hours. In other instances the packages could be only thrown overboard from ships and allowed to drift ashore, taking possibly several days for the trip and receiving a severe pounding.

The landing shown in the illustration is more fortunate. Here LCT (landing craft tank) boats could approach the beach, but the Aleutian climate—one of the worst in the world—constituted a test of packaging that only sturdy, water-proof materials could meet.

In early operations there was much unavoidable spoilage of food and other material in Alaska and the Aleutians and still greater loss in the southwest Pacific operations. Newer packaging withstands equally the climates of Iceland, Africa and the Solomons and even the onslaught of termites and other insects, not to mention stevedores.

The shortage of steel, tin and aluminum necessitated the use of paper, cardboard, fiberboard and wood for containers. As time passed improved methods of waterproofing cartons were discovered, new and stronger fiber-board was developed and laminated wood and other materials were produced having almost the strength of metal but were much lighter than metal. A part of Army veterinary food inspection has to do with the manner of packaging the food.

After the war these new materials and methods should materially decrease the cost of transportation, cut down the loss from breakage and other spoilage and deliver the products in better condition than heretofore.

BAI Completes 60 Years of Livestock Service

The Bureau of Animal Industry, of the U. S. Department of Agriculture, created on May 29, 1884, by act of Congress, completed 60 years of scientific livestock service in May. During that span of years it has led the national attack on livestock diseases and conducted a wide range of scientific work to improve livestock and their products.

Comparable data and estimates indicate that during that period losses from most of the serious infectious livestock diseases have been reduced two-thirds or more. In support of this measure of progress, Bureau officials cite the results of several extensive veterinary activities conducted in cooperation with the states and livestock owners:

Contagious pleuropneumonia of cattle — eradicated completely.

Foot-and-mouth disease — seven outbreaks eradicated completely.

European fowl pest—one outbreak eradicated completely.

Tick (Texas) fever—eradication more than 99% complete.

Tuberculosis in cattle—reduced from a national average of 5% to 0.2%, a decrease of 96%.

Hog cholera — controllable by preventive serum treatment; losses reduced at least two-thirds.

Common scabies of cattle—practically eradicated.

Sheep scabies — losses reduced more than 90%.

Glanders—practically eradicated.

Dourine—practically eradicated.

Other extensive veterinary services were the development of Federal meat inspection and exclusion of foreign infections.

The Bureau's scientific studies of livestock breeding, feeding and management, conducted largely at experimental farms, have resulted in several new breeds and types of livestock and poultry, and in methods of getting more products for feed consumed. Typical of recent results are the popular Columbia breed of range sheep, the Beltsville small-type turkey, the supplemental feeding of phosphates to range cattle in certain areas and new knowledge on the relationship between types and weights of hogs as well as their rates of gain.

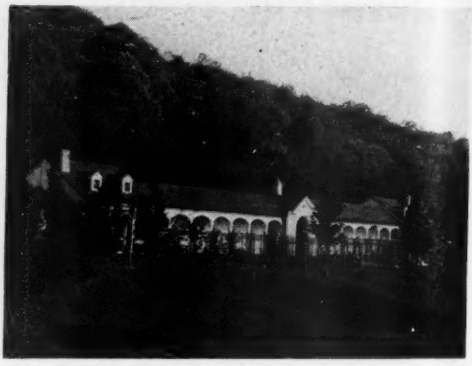
The Bureau's discoveries and services provide the basis for several hundred scientific papers a year, having wide distribution among research workers, livestock owners and the public. Most of the new findings have beneficial, practical applications.

American Veterinarians Honored in Cuba

The University of Havana recently conferred the degree of Professor Honoris Causa of the Veterinary College upon: Nelson S. Mayo, John R. Mohler, Adolph Eichhorn, W. D. Dimock and M. Sarvide (University of Mexico).

Standards of Perfection to Aid Dog Breeders

To make judging more uniform and to give breeders a concrete ideal "to shoot at," the Gaines Research Kennels are working on a series of Standards of Perfection for the various dog breeds, according to Harry Hartnett, director.



Rear view of the Gaines Research Kennels

New property for the research kennels has been acquired recently at Ridgefield Connecticut. It was formerly known as the Outpost Nursery Kennels. Extensive alterations have been made and the dogs are being moved from the Gaines Dog Farm at Sherburne, N. Y.

Considerable progress has already been made in the work with the three breeds—the Cocker Spaniel, the Foxterrier and the Boxer. Outstanding artists are now at work on the ideal delineations of the male and female of these breeds and will later correct them in line with the unified opinion of competent breeders and judges. The Standard of Perfection of the breeds in the poultry and dairy fields has done wonders for the progress and development of these fields. It is hoped that the work on a standard of perfection for dogs will similarly contribute to progress in the dog field.

It is planned to make available at cost, the drawings of the ideal types of the breeds, together with approved descriptions, in suitable brochure form.

Veterinary Officer Awarded Legion of Merit

(Headquarters, European Theater of Operations).—For exceptionally meritorious conduct in the performance of outstanding service as a veterinarian, Major Robert B. Meeks, Kansas City, Kansas, was recently awarded the Legion of Merit in Iceland.

Major Meeks assisted the Icelandic government in the control of diseases which prevailed among the domestic animals. His help to veterinarians and farmers, materially lowered the mortality rate among domestic animals. His papers on the subject were published in the Icelandic veterinary journal.

In closing, the citation states: "Major Meeks won the gratitude of the Icelandic people and, by his courteous, efficient help to the farmers promoted a more amicable relationship between the Icelandic and American peoples."

* * * *

New Effective Method Found for Prevention of Measles Epidemics

A new and effective method for the prevention of epidemics of measles has been developed by a group of the nation's leading medical scientists carrying on researches for the Preventive Medicine Service of the Office of The Surgeon General of the U. S. Army.

Blood plasma is the source of the material known as gamma globulin used in the prevention of measles. Gamma globulin is a protein separated from blood plasma and useful because it contains the so-called antibodies which destroy the germs of measles and thus, in most cases, prevent an exposed individual from developing the disease.

Large supplies of gamma globulin are now on hand and injections will be given to soldiers exposed to measles.

Dr. Edwin J. Cohn at the Harvard Medical School, one of the world's leading authorities on the chemistry of the blood, succeeded in separating blood plasma by chemical means into its various fractions or components, one of which is the gamma globulin. His studies showed that all of the so-called antibodies in the blood are concentrated in this fraction.

Since blood collected for plasma by the American Red Cross comes from thousands of persons who have an established immunity against many contagious diseases, the gamma globulin contained in this plasma is, in effect, a vast treasure house of antibodies against many diseases, not only measles, but diphtheria, scarlet fever, typhoid fever, etc. Gamma globulin is now being separated from a portion of the blood collected by the Red Cross.

British Veterinarian Studies Our Meat Inspection

Mr. John N. Ritchie, M. R. C. V. S. (seated, right) of the British Ministry of Agriculture and Fisheries visited the United States recently for a study of our federal meat inspection and methods of animal disease control. In the course of his study he visited most of the larger meat packing plants and several small establishments, many of the State Agricultural Experiment Stations, various laboratories, most of the veterinary colleges and offices and research installations of the Bureau of Animal Industry.

The photograph was taken during Mr. Ritchie's visit to the Morrell Packing plant, Ottumwa, Ia. Those shown are: Standing, left to right—Dr. E. S. Dickey, consultant veterinarian to Morrell, Dr. C. L. Hall, B. A. I. Inspector in charge at Morrell's, and Dr. E. D. Hubbard of the B. A. I. Branch Pathological Laboratory at Ames, Ia. Seated, Mr. T. Henry Foster, Chairman of the Board, John Morrell & Co. and Mr. Ritchie. Mr. Ritchie is a graduate of the Royal (Dick) Veterinary College, Edinburgh, Scotland and until 1938, when he went to the British Ministry, was attached to the Department of Agriculture in Scotland and assigned to Midlothian County as inspector.

★ ★ ★ BUY WAR ★ ★ ★
STAMPS AND BONDS

Milk Control in New York City

In 1896 the permit system for milk dealers in New York City was initiated, but it was not until 1926 that Grade C Milk was eliminated and the sale of raw market milk completely prohibited. Just recently a further significant step has been taken in the requirement that certified milk must be pasteurized.

Under the Act of Congress authorizing temporary federal meat inspection for meat packers doing an intrastate business exclusively, about three-fourths of the packing plants having state and approved municipal meat inspection in California changed to federal inspection to enable them to sell to the Army and other government agencies.

Sprays for Dog Ticks

Entomologists of the U. S. Department of Agriculture have developed two sprays for ridding vegetation of wood or dog ticks *(Dermacentor variabilis)*. One spray consists of a 1 to 500 solution of nicotine sulfate (1 part 40% nicotine sulfate to 200 parts water) and the other 1.5% sodium fluoride and 0.5% nicotine sulphate with a dram of soap added per gallon of water. Seventy-five to 175 gallons of the spray per acre are required. The first spray does not harm the vegetation; the second injures it. Both are poisonous and live stock should be kept off the area for a time.

Since the dog tick is capable of inoculating persons with Rocky Mountain spotted fever (typhus) and may cause paralysis in both men and dogs by its bites, the department urges that wooded areas (picnic groves), which will be frequented by people, be sprayed.

Equine Encephalomyelitis in Trinidad*

An explosive outbreak of encephalomyelitis occurred in October 1943 among the mules and donkeys near the U. S. Army station in Trinidad. Major Gilyard, station veterinarian investigated the outbreak and determined the source to be *Mansonia titillans*, a far flying mosquito prevalent on the island and on the mainland of Venezuela—six miles distant at the nearest point. The virus was typed at the Army Medical Center at Washington, D. C. and found to be the Venezuelan strain, differing immunologically from both the eastern and western strains in the U. S.

A fatal case of encephalomyelitis occurred in a sailor in Trinidad six weeks before the equine outbreak. It, too, was determined to be due to the Venezuelan strain of the virus.

*Gilyard, Major Richard T. Mosquito transmission of Venezuelan virus of equine encephalomyelitis in Trinidad, *Bul. U. S. Army Med. Dept.*, No. 75, 1944.

The salt and phenothiazine mixture is a prophylactic, not a therapeutic agent. It does not harm the parasites in the intestine but prevents development of the parasite eggs in the feces, thus limiting reinfestation.—*Philip A. Hawkins.*

Vitamania

Vitamin sales for 1943 soared to 173 million dollars, one-third more than in 1942, and became the best selling line handled by drug stores. This expansion was achieved largely through propaganda by radio which is so young it is still in the *caveat emptor* stage and does not object to advertising designed to mislead or defraud the customer.

Veterinary College for Illinois

The Board of Trustees of the University of Illinois has voted to establish a professional course in Veterinary Medicine at the University.

At present there is a strong demand at the university to make the new school a division of the College of Agriculture. Outside of the university the sentiment is for a veterinary college in the university.

This is the third time in the past 40 years that the university authorities have decided to establish a professional school of veterinary medicine in Illinois. In the 1870's the school gave a regular course in veterinary medicine. Professor W. L. Williams was one of the graduates of this first professional veterinary course in Illinois.

Government Veterinarians Win Reclassification

When the conference report on the Department of Agriculture appropriation bill for the 1944-45 fiscal year was under consideration in the House of Representatives June 19th, on the motion of Representative Gillie of Indiana, the House receded from its former position and concurred in the Senate amendment which provided for reclassification of veterinarians in the field division of the Bureau of Animal Industry and of the veterinarians and and lay meat inspectors in the War Food Administration. About 3400 employees of the B.A.I. and the W.F.A. are affected. It is estimated the average, immediate, annual increase in pay for veterinarians will be approximately $400, and for lay inspectors $280. An even greater effect in the future will result from the speeding up of promotion which is provided. Plant supervising inspectors will derive the greatest immediate benefit from the new legislation—many of them receiving an increase of $1200 in annual pay.

Penicillin, Its Possible Uses in Veterinary Medicine

By J. LAVERE DAVIDSON, Lt. Col. V.C.
Sioux Falls Army Air Field
Sioux Falls, South Dakota

THE new drug, penicillin, has received a great amount of publicity during recent months and from all indications it will demand much more in the future.

An English scientist, Dr. A. Fleming, discovered the substance by accident in 1929. He was working on some culture plates containing Staphylococcus. One day he noticed a spot of mold growing on one of the plates. On closer inspection he saw that some of the Staphylococcus colonies were being distroyed by something in the mold. When he recognized the mold as that commonly found in bread or cheese, he began a series of experiments. After his discoveries had been reported in a British Journal, the subject was pursued no further for about 10 years.

At the outbreak of the war Doctor Florey at Oxford brought up the Fleming article and began a series of experiments. The observations of Fleming were found to be true and new articles were published during 1940 and 1941. Then Doctor Florey came to the United States and approached the National Research Council and the Department of Agriculture for help in producing penicillin in large quantities.

At this point it is probably fair to say that it was Dubos' work on gramicidin, an antibacterial substance prepared from a soil bacillus, that brought the scientific world to the realization that antibactericidal agents can be obtained from bacteria and similar organisms. Reports of results from use of gramicidin helped to revive interest in penicillin.

Penicillin is apparently a metabolic product of the growth of the Penicillium mold. Precisely how it is produced in the course of the growth of the mold is not known, but it does not appear to be an important substance in the protoplasm of the mold itself since it is found in the medium on which the mold grows rather than in the mold. It is an exceedingly soluble, yellow substance, possibly related to some of the organic pigments. Some of this color is due to inert material; nevertheless the purest preparations of penicillin, thus far made, still have a yellow color. The substance is produced in appreciable quantities only when the mold is grown on certain media and under controlled conditions. Furthermore, only certain strains of the Penicillium are efficient producers of the substance. The extraction processes are somewhat complex and eventually the material has to be frozen and dried under vacuum.

It is difficult to describe the laboriousness of the process, whereby penicillin is produced and the extreme care with which every step must be conducted to avoid losing the active substance. Penicillin, until it is dried in a purified form, is extremely unstable. The slightest variation of technic may occasion the loss of a large portion or all of the drug.

Each lot of penicillin must be tested for its antibacterial activity, toxicity and the presence of pyrogens. The antibacterial activity is determined by putting dilutions of penicillin into hemispherical depressions in agar culture plates which have been uniformly inoculated with a standard culture of staphylococcus. As the inoculated plates are incubated, the colonies of Staphylococci develop as yellowish dots. A circular zone, in which no bacterial colonies developed, occurs around each cup where penicillin has been placed. The size of this zone depends on the concentration of penicillin in the cup. The standardization of antibacterial activity is made by using an appropriate amount of standard solution of penicillin and comparing the size of the zone produced by this material with the size of the zones produced by dilutions of the test lot. The toxicity of the material is measured by injecting various amounts of it into mice intravenously.

Pyrogens are tested for by injecting the penicillin into the ear vein of rabbits that are kept at rest in special stalls and by recording their rectal temperatures from hour to hour.[1]

Therapeutic Value of Penicillin

The recent article by the group of investigators under the direction of Dr. Chester Keefer[2] of Boston has summarized our present knowledge of the clinical value of this drug. In the treatment of severe staphylococcic infections, penicillin has proved of very great value. Most of the cases in which it was used were cases which had not responded to sulfonamide therapy. Non-hemolytic streptococci infections did not respond as well as the hemolytic variety. Pneumococcic infec-

[1] *Scope*, 6: (15 March) 1944.

[2] Keefer, C. S., Blake, F. G., Marshall, E. K. Jr., Lackwood, J. S., and Wood, W. B. Jr., *J. Am. Med. Ass'n.* 122, p. 1217 (August 28) 1943.

tions, including *Pneumococcus pneumonia,* responded favorably. In the case of *Pneumococcus emphyema,* the best results were obtained when the drug was injected into the pleural cavity. Gonococcic infections are particularly susceptible to treatment with penicillin. Meningococcic infections also are amenable to treatment with this drug.

Penicillin is excreted rapidly and consequently for effective parenteral treatment it must be given either by intravenous or intramuscular route at frequent intervals or by continuous drip at the rate of 5,000 to 10,000 Oxford units per hour.

Penicillin is ineffective when given by mouth. It may be used topically but it must be so applied as to remain in contact with the infected area for a considerable period, since one or more hours of contact are required for it to have an appreciable effect upon the organisms. It is best applied to superficially infected areas as a wet dressing.

One of the great advantages of penicillin is its low toxicity. Occasionally slight fever has been noted, sometimes with chills. These mild reactions will, without a doubt, become less frequent as the preparations of the drug become better.

Penicillin as it exists today is one of the most powerful therapeutic agents thus far discovered, but perhaps of greater significance even than the immediate value of the drug in the treatment of patients is the fact that it opens up a new field of therapeutics into which Dubos' discovery of gramicidin gave us the first glimpse. Undoubtedly the study of penicillin will lead to the discovery of many other antibacterial agents.

Indications and Contraindications for the Use of Penicillin

The following list has been prepared by Dr. Chester Keefer of the Committee on Chemotherapeutic Agents of the National Research Council, and is concurred in by the Office of The Surgeon General.*

Penicillin is the best therapeutic agent available at present for the treatment of:

1. All staphylococcic infections with and without bacteremia: acute osteomyelitis; carbuncles—soft tissue abscesses; meningitis; cavernous or lateral sinus thrombosis; pneumonia—empyema; carbuncle of kidney; wound infections.

2. All cases of clostridia infections: gas gangrene; malignant edema.

3. All hemolytic streptococcic infections with bacteremia and all serious local infections: cellulitis; mastoiditis with intracranial complications, i.e., meningitis, sinus thrombosis, etc.; pneumonia and empyema; puerperal sepsis; peritonitis.

4. All anaerobic streptococcic infections: puerperal sepsis.

5. All pneumococcic infections of meninges, pleura, endocardium; all cases of sulfonamide-resistant pneumococcic pneumonia.

6. All gonococcic infections complicated by arthritis, ophthalmia, endocarditis, peritonitis, epididymitis; also, all cases of sulfonamide-resistant gonorrhea.

7. All meningococcic infections not responding to the sulfonamides.

Penicillin is contraindicated in the following cases because it is ineffective:

All gram-negative bacillary infections: (Typhoid-paratyphoid, Dysentery, *Esch. coli, H. influenzae, B. proteus, B. pyocyaneus, Br. melitensis* (undulant fever), *Past. Tularensis, B. friedländeri*), Tuberculosis, Toxoplasmosis, Histoplasmosis, Acute rheumatic fever, Lupus erythematosus diffuse, Infectious mononucleosis, Pemphigus, Hodgkin's disease, Acute and chronic leukemia, Ulcerative colitis, Coccidioidomycosis, Malaria, Poliomyelitis, Blastomycosis, Nonspecific iritis and uveitis, Moniliasis.

Possible Veterinary Uses of Penicillin

It seems to this writer, that the use of penicillin in veterinary therapeutics will meet with the same dramatic successes that it has in human medicine.

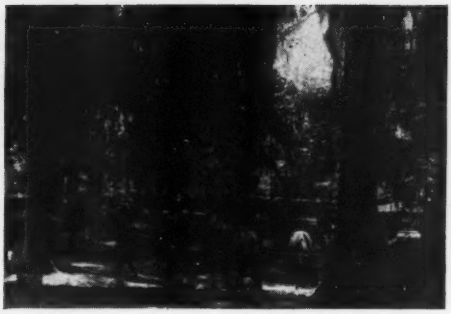
From the limited amount of work accomplished with this drug and the favorable case reports of the use of gramicidin in bovine mastitis, it seems probable that this widespread cattle disease will be made more amenable to therapeutic treatment than ever before. It is a rational theory that much better results can be expected from the parenteral injection of penicillin than from using it as an udder infusion. From the before-mentioned facts it can be seen that it will be necessary to administer large doses parenterally.

Some of the other animal diseases that may benefit from penicillin therapy are canine encephalitis and meningitis, certain of the pneumonias, staphylococcic septicemia, pustular dermatitis and calf diphtheria. It will be interesting to see what effect, if any, this drug may have in curing the actinomyces infections.

When this drug is made available to the veterinary profession its cost may prevent its extensive use in large animals, but it will undoubtedly be widely used by the small animal clinicians. It is a therapeutic agent to look forward to in the practice of veterinary medicine.

*War Department Technical Bulletin TB MED 9, February 12, 1944.

Factors to Be Considered in Conditions Causing Clinical Manifestations of Central Nervous Disturbances



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INVESTIGATIONS which have been carried on during the past decade on diseases manifesting central nervous disturbances have added much to our knowledge as to their nature, causes and methods of control. Extensive histologic studies of the central nervous system in some instances revealed definite pathologic changes which we now associate with certain types of disorders. These changes are of the greatest value in determining accurate diagnoses. Some of the factors to be considered in making diagnoses of central nervous disorders include the following:

1. *Viruses*
   - Encephalomyelitis
   - Rabies
   - Pseudorabies
   - Some forms of avian leucosis
2. *Bacteria*
   - Listerellosis
   - Botulism
   - Pasteurellosis
   - Pyogenic infections
3. *Toxins of Unknown Origin*
   - Leucoencephalomalacia
   - So-called corn stalk disease of cattle
   - Silage poisoning of horses
4. *Nutritional Deficiencies*
5. *Miscellaneous Conditions*

Virus Diseases

Equine encephalomyelitis, St. Louis encephalitis, human anterior poliomyelitis and louping-ill of sheep, all caused by filterable viruses, are typical of this group. With rare exceptions equine encephalomyelitis and St. Louis encephalitis are correlated with the incidence of biting insects. Under experimental conditions various species of mosquitoes and ticks have transmitted the infection to susceptible hosts. A review of the extensive literature dealing with these studies will not be included in this discussion. However, the findings of Kitselman and Grundman of Kansas in 1940, should be mentioned because the demonstration of the equine encephalomyelitis virus in *Triatoma sanguisuga* (assassin bug, Mexican bed bug) caught in the field was the first time that the equine encephalomyelitis virus was isolated from an insect in nature. The virus recovered proved to be that of the western type. As a rule, in Iowa, equine encephalomyelitis occurs from July to October depending upon weather conditions. Meningeal and intracranial edema frequently occur. The organ so affected is sometimes referred to as a "wet brain." Congestion or slight hemorrhage is often observed on the cut surfaces in parts of the brain. Microscopically the pathologic changes consist of perivascular infiltrations by monocytes and varying numbers of polymorphonuclear cells. Isolated foci of infiltrated cells may also occur independent of the capillaries or larger blood vessels. The nerve cells also show degenerative changes. These lesions are associated with functional disturbances.

Although certain parts of the brain usually show these cellular changes more consistently, variations in the intensity of these reactions are found which may account for the differences in the clinical picture shown by individual cases. Some cases terminate fatally before any well developed clinical symptoms are observed, while others show varying degrees of incoordination followed by paralysis of the limbs, eyes, lips, facial muscles, tongue and other organs. Progressive paralysis may continue until some vital organ is involved terminating in death. The course of the disease in other cases may become static for some time followed by recovery which may be complete or incomplete.

During outbreaks of the disease, material was submitted to our laboratory in order to confirm the clinical diagnosis. A considerable number of cases failed to show evidence of the virus or virus reactions. Other clinical diagnoses were confirmed by laboratory examination. One group of cases included eight positive cases of equine encephalomyelitis, one leucoencephalomalacia (moldy corn intoxication), a brain tumor (teratomatous cyst) which exerted pressure against the pons and adjacent brain structure producing clinical symptoms simulating those typical of the virus disease. Other cases remained unsolved, some

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being suggestive of intoxication of unknown cause, characterized by severe icterus and brain degeneration.

The viruses of rabies and pseudorabies also produce cellular changes in the central nervous system that with certain modifications resemble those of the encephalitic group. It, also, must be pointed out that certain viscerotropic or panatropic viruses (malignant catarrhal fever and hog cholera) likewise cause cellular degeneration and perivascular and focal infiltrations in the central nervous system. Avian encephalitis and some forms of avian leucosis

Nervous stage of infectious encephalomyelitis —*Photo by Newsom*

also are examples of specific infections in which clinical symptoms of a central nervous disturbance frequently occur. The final diagnosis of a neurotropic virus infection must be based upon the demonstration of the etiologic factor.

Bacteria

Listerellosis.—Certain types of bacteria apparently have a special affinity for the central nervous system. The Listerella organism, often causing a typical neurotropic infection, is responsible for considerable losses in cattle and sheep. It has also been reported in swine of Iowa. The lesions produced show a resemblance to those of equine encephalomyelitis and louping-ill. The resemblance is so great that, when the first outbreak in sheep was encountered, the virus of louping-ill was suspected when the histologic examinations were made. There have been no outbreaks of louping-ill recorded in the United States. The clinical picture and pathology of listerellosis are similar to those of the virus diseases under discussion. The Listerella organism is about 0.8 x 1.6 microns in size and is positive to the Gram stain.

Frequently a pathological process which is associated with a given disease is interpreted

A case of listerellosis exhibited at a Veterinary Conference at the University of Illinois

as being specifically diagnostic of that disease. These pathological processes must be regarded as group reactions rather than specific lesions. Perivascular cuffing, focal infiltration and nerve cell degenerations are changes that may appear in both virus and bacterial infections. Likewise the clinical manifestations of various central nervous disorders may show much similarity. The history, epidemiology and laboratory findings are the only basis for a definite diagnosis.

Botulism.—Although this condition is included in the group of bacterial diseases, the injury is caused by the toxin of *Clostridium botulinum*. The toxic action is exerted chiefly on the nervous system and the clinical picture bears some resemblance to some forms of specific encephalitis. Because of the absence of characteristic pathologic lesions it is often difficult to make an accurate diagnosis. The appearance of *Cl. botulinum* in the suspected feed cannot be relied upon because of the relatively wide distribution of the organism in nature. The presence of the botulinus toxin in the feed should be the basis for a final diagnosis.

Pasteurellosis.—Occasionally Pasteurella infections may localize in the central nervous system and apparently have little or no effect on the other organs. This condition was

Birds affected with botulism in the early stages, before complete paralysis had occurred. The bird on the right has the typical bowed neck which results where the muscles on one side are affected (paralyzed). The bird on the left has lost control of all of the muscles of the neck. Its wing muscles too are partially paralyzed. —*Photo by Durant*

brought to our attention when some sheep were submitted to our laboratories for diagnosis. Considerable losses had been experienced by the owner and the history and clinical manifestations were strikingly similar to those of listerellosis. The histologic examination of the tissues taken from various field cases indicated early degenerative changes accompanied by cellular increase. Numerous polymorphonuclear and monocytic leucocytes were usually found in the blood vessels as well as in the surrounding tissue. The meninges were similarly affected. Perivascular cuffing and focal infiltration characteristic of listerellosis were not observed. The Pasteurella organism was recovered from the brains of the affected sheep.

Abscesses in the Central Nervous System

Abscesses which affect the central nervous system may be local or metastatic in nature. The metastatic abscesses develop in multiple foci of infection involving various organs as well as the central nervous system. Multiple abscess formation may accompany such infections as strangles in horses, navel ill, brucellosis, tuberculosis as well as abscess formation in the liver.

Hull and Taylor[1] reported a variety of clinical symptoms in sheep caused by abscesses in the brain and spinal cord. Some of the abscesses were found to be sterile and *Corynebacterium pyogenes* was isolated from others. In some instances the pressure on the nerve fibers caused by the abscesses apparently caused motor disturbances while the more advanced cases showed definite degeneration of the nerve fibers.

[1] Hull, F. E., and Taylor, E. L. Abscesses affecting the central nervous system of sheep. *Am. J. Vet. Res.* 2:4, p. 356, 1941.

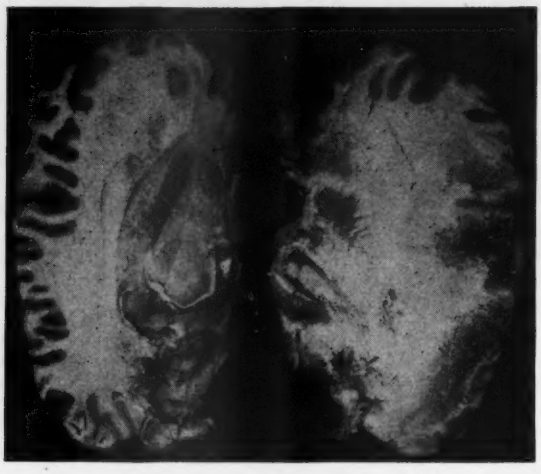
Intoxications

Considerable losses of livestock are experienced from time to time as the results of various intoxications. These toxic conditions may be due to the growth of certain types of molds and bacteria, or the formation of toxic compounds resulting from intermediate chemical changes which occur in plants under abnormal weather conditions. Some forms of intoxication which are clinically similar to virus encephalomyelitis make their appearance in Iowa early in November.

Leucoencephalomalacia (moldy corn poisoning). The heaviest losses usually occur at corn-picking time during wet seasons when the corn is exposed to frost before it matures. These weather conditions are favorable for the development of molds on ears of corn, especially on those which are immature. Shortly after K. F. Meyer and others definitely established the presence of virus encephalomyelitis in the United States, many diagnoses of this disease were made by practitioners in the northern and central states during the winter months and were treated accordingly. Invariably the characteristic microscopic lesions associated with the virus disease could not be found in such cases during the late fall and winter. These usually proved to be cases of leucoencephalomalacia.

In leucoencephalomalacia the gross and microscopic lesions of the brain tissue which are observed consist of numerous hemorrhages and edema with various stages of degeneration frequently terminating in areas of liquefaction

necrosis. These necrotic foci are usually a bright, lemon yellow in color and are confined to the leucoencephalon or white matter of the brain. This condition is designated as leucoencephalomalacia or moldy corn intoxication. Occasionally miscroscopic hemorrhages, edema and degenerative changes may be observed in the spinal cord. The clinical manifestations may vary greatly as in any central nervous disturbance. Many of the cases first show various stages of depression which become progressively worse followed by incoordination, paralysis and death. Sudden deaths frequently occur shortly after the appearances of the first clinical symptoms. Violent symptoms are not infrequent, during which the horse may plunge through fences, gates or even the side of a wooden barn. These violent symptoms usually occur shortly before death. The various clinical symptoms and course of the disease seem to be largely dependent upon the location and extent of the lesions in the brain tissue. Unilateral involvement as in the virus disease may cause the animal to walk in circles in one direction or lie on one side only. When an animal thus affected is turned and made to lie on the opposite side, it soon turns and assumes its original position. These clinical symptoms are frequently observed in field cases and have been reproduced experimentally by feeding moldy corn. The severity of the intoxication is largely dependent on the degree of toxicity and the amount of the toxic feed consumed.



Longitudinal incisition of cerebral hemisphere in a case of leucoencephalomalacia or toxic encephalomyelitis, showing areas of softening, hemorrhage and edema. Both right and left hemispheres showed circumscribed areas of softening at the junction of the white and gray matter. The areas of softening varied in size from ½ cm to diffuse areas involving ⅓ of the cerebral hemisphere—*Photo by Graham*

So-called Corn Stalk Poisoning of Cattle.—Corn which is moldy and extremely toxic to horses has apparently no untoward effect on cattle or hogs. However, during severe drought, the development of the corn plant is seriously retarded and the chemical composition of the plant is altered considerably. Horses are able to eat drought injured corn without any injurious effects, but in many instances it is extremely toxic for cattle. Cattle frequently die within 24 hours after feeding in such fields. The specific toxic factor is not known. It is not caused by cyanides. Corn has not been known to be cyanogenic in this country. The presence of excessive quantities of potassium nitrite was suspected of being the toxic factor, but fatal cases of potassium nitrite poisoning produced experimentally showed pathological lesions which were entirely different.

The toxic reaction of such corn is of a transient nature. It is believed to be the result of intermediate chemical changes taking place in the corn plant. It has been demonstrated that such toxic corn plants if cut and removed from the field lose their toxic properties in a comparatively short time. Furthermore, if cattle are removed from the field for several weeks, allowing the plants to cure and undergo further desiccation in the field, the toxic properties gradually dissipate. It is always well to be cautious and to be sure the corn plants are no longer toxic before returning cattle to such fields.

Silage Poisoning in Horses.—It may be well to discuss this condition briefly in connection with food poisoning, as serious losses in horses are often experienced from toxic corn silage, occurring most frequently at the time the silo is first opened and the top layers, which are exposed to the air, are removed and discarded. The silage may be moldy or decayed and is highly toxic for horses while it apparently has no detrimental effect on cattle. Trench silos, particularly those which are not properly constructed, are especially dangerous in this re-

spect. This toxicity is in no way associated with botulism and is rather difficult to diagnose from the existing pathologic lesions. The clinical symptoms often resemble a central nervous disturbance and may be confused with encephalitis. The history of the case and the presence of toxic material in the digestive tract may aid materially in diagnosis.

Nutritional Disorders

Deficiencies of vitamins, proteins or minerals in the ration may be manifested by disturbances which simulate those found in virus or bacterial infections of the central nervous system. Under field conditions nutritional disorders are usually due to partial deficiencies of more than one essential constituent. The clinical and pathological pictures of malnutrition seen in the field may not follow those described in experimental cases produced under controlled laboratory conditions by feeding rations from which only one given factor has been completely removed. Furthermore, the various specific nutritional deficiencies may be variously manifested in different species of animals. Under these circumstances the diagnosis must be based in part upon the elimination of virus or bacterial factors and an evaluation of the ration being fed. The latter should be accomplished by using tables containing the average composition and digestible nutrients of feeds. However, certain allowances must be made for these average values when conditions are unfavorable for the growth of crops, because during such periods of unfavorable plant growth, some of the essential constituents may fall below the average values.

Miscellaneous Factors

General Pathological Processes in Special Organs.—Neoplastic formations which involve parts of the central nervous system frequently cause clinical symptoms similar to neurotropic infections or certain deficiencies. Tumors of the brain, cord or any major nerve structure may be reflected in impaired function of the part involved caused by destruction of the nerve tissue, mechanical pressure, or inhibition of the circulation. The nature and severity of the symptoms depend largely on the location and extent of the pathological process. During an outbreak of equine encephalomyelitis, material from a typical clinical case was sent to the laboratory for confirmation of the diagnosis which was made in the field. There proved to be no evidence of either virus or bacterial infection. However, a teratomatous cyst was found in the base of the brain which exerted sufficient pressure on the adjacent structures to cause typical manifestations of a central nervous disorder.

Endocrine Disturbances.—Severe central nervous disorders are sometimes associated with radical disturbances in the endocrine system in both man and animals. The literature contains little definite information regarding this relationship. Reference to this condition was reported by Rothermich and von Haam[2] in which a pathologic condition of the

Central nervous system symptoms consequent upon dysfunction of the thyroid gland are varied
—Photo by Welch

pancreas was associated with definite central nervous symptoms. Post-mortem examinations of these cases showed various degrees of glandular degeneration and necrosis of the pancreas together with chronic interstitial pancreatitis. The neuropathological lesions consisted chiefly of capillary necrosis and petechial hemorrhages with subependymal gliosis. Because of the absence of any other pathological condition, it was assumed that severe central nervous disorders may be associated with degenerative changes in endocrine glands.

Hereditary Factors.—Congenital or inherited tendencies toward central nervous disorders are infrequent but are very confusing when encountered. It has been known for years that the progeny of certain horses and cattle appear unduly nervous and excitable, sometimes becoming vicious later. Occasionally on swine farms where intensive inbreeding is practiced, some of the progeny showed well defined nervous symptoms. This condition occurs, frequently, over a period of years and may be eliminated by a change in breeding stock. While there is little definite information regarding this condition it is assumed that certain inherited characteristics are responsible.

Injuries.—Injuries to the central nervous system or peripheral nerves at the time of birth sometimes cause nervous disorders which may be temporary or permanent. Incoordination, lameness or a general spasticity may develop.

[2] Rothermich, N. O., and von Haam, E. Pancreatic encephalopathy. *J. Clin. Endocrinology.* 1, p. 872, 1941.

Studies of Toxicity of Wild Winter Peas (Lathyrus Hirsutus) for Cattle

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LATE in the spring of 1941, 1942 and 1943, a peculiar and rather characteristic lameness appeared in several herds of cattle grazing late on pastures in Alabama. Both practising veterinarians and cattle owners stated that this condition had not been seen previously. Affected animals varied in age from about six months to more than eight years. On some premises

Mature, ungrazed wild winter peas (*Lathyrus hirsutus*)

only a few cases developed while on others most of the cattle showed symptoms. In every outbreak reported to the authors, all affected cattle recovered completely.

In one herd of about 150 head of beef animals, seen in 1941, about 100 cases occurred between the third and fifth days after they were turned in a pasture in which there was a very luxuriant growth of *Lathyrus hirsutus*, or wild winter peas. Blossoms and pods containing immature seed were plentiful on these plants. They were being eaten almost to the exclusion of all other forage. They were suspected as being the causative agent of the illness, especially since other species of this genus (*L. sativus, L. cicera, L. clymenum*,[1] and *L. odoratus*[2]) have been reported as being poisonous. All outbreaks which were seen in both 1942 and 1943 were in cattle grazing on wild winter peas which were blooming and forming seed.

This paper reports studies of toxicity of *L. hirsutus* for cattle.

Experiments

1. *Controlled feeding.*—When the lameness appeared in pastured cattle in 1942, green flowering plants which carried numerous seed-forming pods were gathered from a pasture on which trouble was occurring and taken to Auburn for a feeding experiment. They were stored in bags in a cold room so that very little drying took place. The supply was replenished from the same source after five days and again after 10 days. All plants other than wild winter peas were removed by hand picking before this material was fed.

A normal heifer, 12 months old, was used in this experiment. She had been purchased when one day old and had been kept on the premises of the Regional Animal Disease Research Laboratory until this experiment was started. She had not been exposed to any cattle showing symptoms of this disease. She was placed in a box stall and given no other feed than *L. hirsutus*. This was eaten readily. It was kept before her at all times. Temperature, pulse rate, respi-

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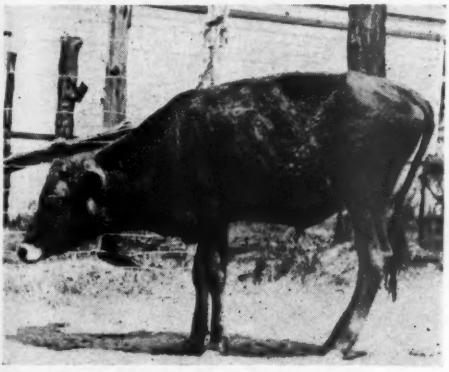
ratory rate, and color and consistency of feces were recorded daily. Red blood cell counts, total and differential white cell counts, hemoglobin content of blood, percentage volume of packed red cells and sedimentation rates were recorded three times a week. None of these deviated from normal at any time during the experiment.

On the fifth day the animal was slightly lame in the right hind limb. In standing, she placed this foot a little forward of the normal position and it supported very little weight. In walking, it was swung forward with some apparent difficulty. When weight was taken on it, the other leg swung forward very quickly so that the weight-bearing time of the affected leg was shortened. No hot, swollen, or tender areas could be found. The animal appeared normal in every other way.



Wild winter pea poisoning in a yearling. The position of hind legs is typical

The following day the lameness was much more severe and all legs were affected. The animal spent much time lying down. When forced to rise, she stood with the back arched, the head low and somewhat extended and all four feet drawn well under the body. A slight tremor of the extensor muscles of the stifle was observed. She moved with great reluctance. In walking, the strides were very short and there was a tendency to take more steps with the forelegs than with the hind so that the normal rhythmic movements of locomotion were lacking. The forelegs were kept well back of the normal position and the hind limbs well forward. The lameness did not improve materially with exercise.

Manual flexion and extension of the joints did not cause any pain symptoms. Neither did pressure over the muscles and articulations of locomotion. The skin seemed to possess normal sensibility. She did not appear to be excited or nervous. The pupils responded to light. She ate readily while on her feet but probably consumed somewhat less than usual because she spent so much time lying down.

There was very little change in her condition for about seven days, after which gradual improvement took place. By this time she was being fed plants which were much more mature and which had lost some of their seed. The supply of *L. hirsutus* was exhausted on the fifteenth day after the symptoms appeared. Following this she made a rapid and uneventful recovery.

2. *Pasture tests.*—During the fall of 1941, a 12-acre pasture was planted to wild winter peas. The lot of seed used contained some vetch (*Vicia villosa*). December 15, 1942 a group of six steers (Lot I), about 18 to 20 months of age, was placed in this pasture. At this time the plants were large enough to afford satisfactory grazing. The cattle ate both the wild winter peas and the vetch readily. They received no supplementary feed at any time during the experiment. They stayed in good condition and gained weight satisfactorily during the winter and early spring months. By May 15, 1943, the entire pasture was covered with a heavy growth of *L. hirsutus* and vetch. Both plants were blooming and forming seed. None of the cattle had shown any symptoms of lameness. At this time a second group of six steers (Lot II), about two years of age, was turned on the pasture.

One of the steers in Lot I was lame on May 17, the symptoms being similar to those seen in the experimentally fed heifer. Four days after the second lot was placed on the pasture, one of them developed typical symptoms. Within the next week three others of this lot became lame. All other animals in both lots were a little stiff or lame at some time during the test period but they were so slightly affected and recovered so quickly it is impossible to say positively that they developed symptoms of poisoning.

One of the five that were definitely af-

fected became very severely lame. It was difficult to force him to walk at all.

The affected cattle continued to eat and seemed normal except for the lameness. In some animals the severity of the lameness varied considerably from day to day. One which seemed to have recovered developed marked symptoms a second time. All severely affected animals spent most of their time lying down, became quite gaunt and evidently lost weight. But soon after the lameness abated they regained their former condition. As the plants matured the affected cattle showed improvement. All of them made apparently complete recoveries while still on the pasture. They were in good condition when sold for slaughter on June 11, 1943.

During the 27-day period from May 15 to June 11, which covered the time of the appearance and disappearance of symptoms, the five affected steers made average gains in weight of 26 pounds per head although one of these, the most severely lame steer mentioned above, lost 10 pounds. The seven steers which did not develop definite symptoms made average gains of 47 pounds per head during this time.

3. *Hay feeding.*—May 18, or the day after the first steer on the pasture became lame, *Lathyrus* hay was cut from a field immediately adjacent to this pasture. This field and the pasture had been planted at the same time with seed from the same source. The wild winter peas and vetch were blooming and making seed when they were cut. The plants seemed to be at the same stage of maturity as those in the pasture. The hay cured satisfactorily and both its appearance and its odor indicated it was of of good quality.

Two lots of calves were fed this hay. The first lot, consisting of seven small weaned dairy heifers, was taken from a good pasture, placed in a dry lot, and fed this hay exclusively for 30 days from June 23 through July 22, 1943. All the animals remained apparently normal during the test period. Each one gained some weight, the average being 7.1 pounds per head.

The second lot consisted of two calves approimately nine months of age which had been on dry feed about three months. They were placed in a box stall with a concrete floor and fed this hay exclusively for 25 days beginning June 25, 1943. They ate it readily. One gained 13 pounds and the other 25 pounds during the experiment. No lameness or other abnormality was observed during the 25-day feeding period or during the 30 days they were under observation after the feeding was discontinued. Red and white blood cell counts were made and percentage volume of packed red cells was determined thrice weekly during the test period. No deviations from normal were noted.

Discussion

Although *L. hirsutus* has been recommended as a winter legume for the Deep South for many years,[3] it has only recently come into general use. Cases of poisoning were reported shortly after cattle began grazing almost exclusively on this plant. Since its principal value in a livestock program seems to be as winter and early spring pasture, toxic properties which develop only after blossoms are formed should not mate-

Wild winter peas *(Lathryus hirsutus)*

rially lessen its usefulness. This is especially true if further tests prove definitely that the hay is harmless.

The other species of *Lathyrus* which have been reported as being toxic have usually produced symptoms in horses more readily than in cattle. Steyn[4] fed two young cattle 591 kg. of *L. sativus* in the flowering and preflowering stages in 22 days without producing any ill effects while one horse died on the 35th day after having eaten only 112 kg. of the same lot of *Lathyrus* and a second horse, which ate 212 kg. in 55 days, developed symptoms as early as the twenty-fifth day. Long[5] listed *L. cicera, L. clymenum,* and *L. sativus* as being poisonous to man, horses, cattle, hogs and sheep—particularly to horses. While no cases of *L. hirsutus* poisoning of other animals than cattle have come to the attention of the authors, it is quite probable that such will occur as the plant becomes more widely grown and grazed. Veterinarians and livestock owners should watch for cases among any animals being pastured on wild winter peas.

The experiments and observations reported in this paper have not proved which part or parts of the plant are toxic. One of the authors (R. S. S.[6]) produced symptoms in rabbits with both aqueous and alcoholic extracts of flowering plants from which all blossoms and seed pods had been removed. Both Salmon[7] and Haag[8] have produced lathyrism in rats by feeding seed of *L. hirsutus.*

Most of the lathyrism reported in the literature has resulted from eating seed. Both the negative results of the hay feeding experiment and the recovery of the affected steers which were kept on the pasture on which they had developed the disease might be interpreted as evidence that the ripe seed of the species under investigation are not poisonous to cattle. But since the mature seed pods dehisce quite generally, it is possible that shattering rather than absence of toxic products in the seed was the factor concerned in these tests.

The short prepatent period, the absence of paralysis and the complete and rather rapid recovery of all affected cattle observed so far are all somewhat at variance with Boissiere's[9] description of poisoning of cattle by *L. clymenum.* It may be that the toxic constituents of wild winter peas are somewhat different from those in other species.

The steers in Lot I, which had been kept on the wild winter pea pasture continuously in the grazing experiment, may have developed a partial tolerance to the plant, but it is conceivable that the higher number of cases of poisoning in Lot II was the result of a greater intake of forage because of the animals being very hungry when first turned on the pasture.

Since *L. hirsutus* seems destined to become a very generally used and very valuable soil building, grazing and hay plant in a large area in the Deep South, intensive studies of its toxicity should be made.

Summary

1. Cattle pastured on *L. hirsutus* (wild winter peas) while these plants were blooming and forming seed, developed a rather typical lameness.

2. A single heifer showed similar symptoms after being fed for five days on an exclusive diet of these plants in the flowering and seeding stage.

3. Steers grazed continuously on *L. hirsutus* for more than five months did not develop symptoms until the plants bloomed and formed seed pods.

4. All affected cattle observed made apparently complete recoveries even when they continued eating these plants.

5. Cattle fed *L. hirsutus* as hay did not develop any untoward symptoms.

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Lesions Associated with Larvae of the Blow-Fly in the Stomach of a Pig

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THE animal upon which the present observations were made was a male pig belonging to the Red Duroc-Jersey herd of the Coastal Plain Experiment Station, Tifton, Georgia. This pig was farrowed March 3, castrated April 17, and weaned May 11, 1942. May 14, 1942 it was put in a feed lot with 17 similar pigs and fed shelled corn, alfalfa meal, tankage, cottonseed meal and minerals from wooden feeders. This pig made satisfactory gains until October 12, 1942 when it weighed 210 pounds. Two weeks later it weighed only 185 pounds—a daily loss of almost two pounds during that time. Nor did it gain weight prior to slaughter November 10, 1942.

Immediately after slaughter the lungs and abdominal viscera were removed and placed in a cold room (temperature approximately 4° C.) for about 24 hours before they were examined for parasites. The following helminth parasites were recovered: 60 *Ascarops strongylina* and 14 *Physocephalus sexalatus*, from the stomach, 512 *Strongyloides ransomi*, from the small intestine, 6 *Oesophagostomum longicaudum*, 4 *O. dentatum*, 1 *O. brevicaudum*, and 3 *Trichuris suis*, from the large intestine. No lungworms were found. The large and small intestines were normal in appearance, but the stomach was enlarged and greatly distended with food. When the stomach was opened it was noted that the strong, sour odor characteristic of the contents of healthy pig stomachs, even after refrigeration, was absent. Mixed with the ingesta were approximately 2,500 dipterous larvae which, unfortunately, were dead at the time the stomach was opened. These larvae were later identified by Dr. W. E. Dove of the Bureau of Entomology and Plant Quarantine, as *Sarcophaga bullata* Parker. A small number of pupae of *Musca domestica* L. were also present. No larvae were found in four other pigs from this same lot on which necropsies were held at approximately the same time.

The lesions found in the digestive tract were confined to the stomach. The most prominent lesion observed, and the one that may have been responsible for the loss of weight, was a large, partially healed pyloric ulcer (fig. 1 A). The cause of the ulcer is not known. In addition there were several smaller lesions (fig. 1 B) which appeared to be of relatively recent origin as shown by the fact that blood had been oozing from them and, also, by the absence of any signs of healing. The gross appearance of the fresh lesions gave the impression that they could have been produced by the dipterous larvae feeding on the stomach mucosa. No glass or other sharp objects which might have produced the lesions were found in the alimentary tract.

That pigs ingest many insect larvae with soil and with feed, which has been allowed to accumulate in troughs and to become breeding places for flies, is a well known fact. In the present instance, blow-flies had been seen to deposit eggs in wet, fermenting, tankage in one of the feeders. When ingested by healthy pigs the majority of the larvae are probably digested. In this one case, however, it is thought that the functioning of the stomach was interfered with by the presence of the pyloric ulcer and consequently the larvae were not digested.

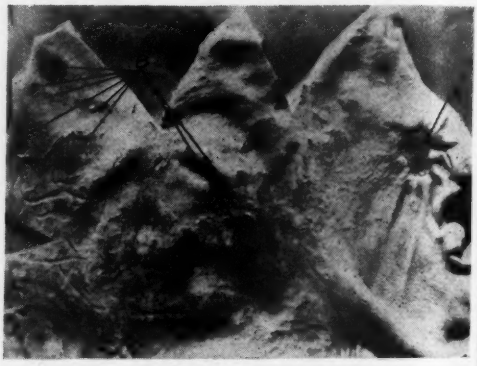


Fig. 1. Stomach of pig showing—A. Partially healed pyloric ulcer; B. relatively fresh lesions apparently associated with larvae of *Sarcophaga bullata* Parker

Although the writers know of no recorded instance of blow-fly larvae causing lesions in the stomachs of pigs, they feel that the present observation should be recorded because (1) the pig in question was the only one of 172 pig carcasses on which post-mortem examinations were made at the Coastal Plain Experiment Station that harbored large numbers of fly larvae and presented the type of lesions described, and (2) the lack of normal acidity in the stomach contents might account for the larvae not being digested.

*Zoological Division, Bureau of Animal Industry, United States Department of Agriculture.

Vitamin A Deficiency in the Production of Pregnancy Disease of Sheep*

By J. O. FOSS† and D. F. EVELETH†
Fargo, North Dakota

PREGNANCY disease of ewes is one of the more serious diseases among sheep. The exact etiological factors responsible for the production of this disease have never been clearly established. The possibility of vitamin A deficiency playing a part in the development of ketosis and fatty degeneration of the liver is suggested by the following cases.

During February, March and April of 1944 a considerable number of ewes were presented for diagnosis. The members of the department were also consulted concerning other cases which apparently were similar in nature.

Five pregnant ewes were examined from one flock, February 18. There were about 30 out of 300 affected and several more were showing up daily. The symptoms noted suggested the syndrome of pregnancy disease and also a marked vitamin A deficiency. Weakness was extreme as the ewes had been visibly affected for several days. A marked conjunctivitis was present and the cornea was opaque with orange discolorations. Urine samples were obtained and all gave strongly positive tests for ketones.

Two animals which were near death were killed and a post-mortem examination conducted. Twin lambs were found in both. Fatty degeneration was evident in the livers but not marked. The kidneys were practically normal, only a slight swelling noticeable. Few gastro-intestinal parasites were found but nodules were abundant throughout the length of the intestine from previous nodular worm infestation. On examination of the brains a pronounced congestion was found in each. They were placed in glycerin for bacteriological examination. The eyes, too, were saved for later study. In both ewes the lambs were in the process of maceration. Their livers were mottled and eyes slightly opaque.

Treatment was attempted on one ewe which, though weak, was able to walk. One hundred cubic centimeters of 20% calcium gluconate and dextrose solution were gravitated slowly intravenously. Shock symptoms were soon evident and death occurred in a few minutes. On post-mortem examination lesions similar to the above description were seen. The uterus contained twin lambs which did not survive. The brain of this animal did not exhibit the congestion as noted in the other two. The remaining two ewes were kept under observation.

The feeding program as outlined by the owners appeared adequate. The ration had consisted of corn silage and two-year-old alfalfa hay. The silage had been fed until Jan. 1, when grain was substituted. It was admitted that the silage had a low grain content. The hay appeared to be of good quality and was quite green. A sample was secured for vitamin A determination.

Cultures were made on the brain specimens and laboratory animals inoculated to ascertain the presence or absence of listerellosis. According to Biester and Schwarte[1] fatty degeneration of the liver does occasionally occur in this disease and the brain congestion suggested this possibility. In a few cases of listerellosis they had also noted a grayish cornea. No growth was secured on these cultures and the laboratory animals remained in good health, indicating no Listerella infection. The brain congestion observed at necropsy may be explained as a state produced by the moribund condition of the ewes. The circulation had undoubtedly been sluggish for sometime.

Bruce[2] described an eye infection in a flock of sheep caused by *Corynebacterium enzymicum* which had similar pathological eye changes to that seen here. Cultures were made from the eyes of two ewes but they proved negative. Vitamin A deficiency as the cause of the eye lesions thus seemed a logical assumption.

The report* on the carotene content of the alfalfa hay revealed an exceptionally low amount, a fact which strengthened the as-

*Published by Permission of the Director, North Dakota Agricultural Experiment Station.
†Department of Veterinary Science, North Dakota Agricultural Experiment Station.

*We are indebted to Dr. M. I. Wegner of the North Dakota Agricultural College, Department of Animal and Human Nutrition for the carotene determination of the alfalfa hay.

sumption that vitamin A deficiency was the major factor concerned.

Although the hay appeared to be of good quality, the ageing would account for the low carotene content. The silage apparently had a low carotene value because of its failure to protect the ewes. Hart[3] states that sheep on a diet deficient in vitamin A suffer from night blindness and in some cases have permanently defective vision in semidarkness, irrespective of a subsequent vitamin A intake or storage.

The flock was kept on the same ration with

Opaque cornea in a lamb

the addition of a vitamin A and D supplement prepared and sold by a commercial supply house. The results as reported later by the owners were better than would have been expected without treatment. No new cases developed after 48 hours and many of the affected ewes were showing distinct improvement.

The two ewes which had been kept under observation were also given concentrated vitamin A in capsules, 30,000 units daily, plus the prepared supplement in their feed. Some improvement was noted in the eyes but the ewes did not gain in strength. Both lambed within a week. Two of four lambs were born alive and capsules containing 5,000 units of vitamin A were given to each. One of the two survived but neither ewe recovered.

As ewes from other flocks were submitted the owners were questioned closely concerning the feeding. In one case the owner stated the ewes had been allowed to range on stubble fields during the winter which was an open one. The sheep also had access to a stack of alfalfa hay. One ewe brought in was not in poor flesh but was apparently blind with no visible eye lesions and held her head high and back. Now and then the lips and ears would twitch convulsively and the body would tremble. She was soon to lamb and so was put in a stall for observation. A urine sample gave a strongly positive ketone test. She was

Subcutaneous edema

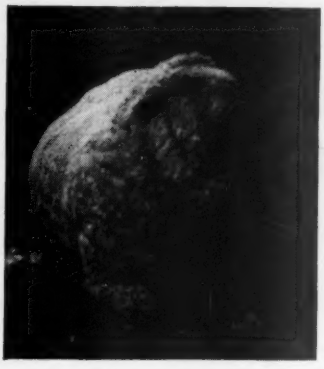
given 30,000 units of vitamin A daily by capsule and some improvement was noted in locomotion and eyesight. The symptoms shown by this animal are comparable to those seen in some cases of acetonemia in cattle, and which, according to Patton[4] is shortly relieved by heavy doses of vitamin A. This animal however, was found dead on the fifth day. On necropsy it was found the twin lambs had been dead long enough to begin to decompose. The liver was fatty and the brain was slightly congested. Animal inoculation and cultures failed to indicate the presence of an infectious disease.

Several ewes from a third flock were observed and autopsies performed. The ration consisted of poor grade alfalfa hay which was moldy and brown indicating a low carotene content. The eyes showed no gross lesions but sight was affected and nervous symptoms were evident. Some ewes were down in a typical pregnancy disease posture. All urine samples gave positive ketosis tests and on post-mortem examination fatty degeneration of the liver was found the predominant pathological change. The eyes of some of the lambs were slightly opaque. This owner apparently failed to follow the suggestion of adding the vitamin supplement and no more information was received on this flock.

Several of the college ewes were submitted to the department for treatment. They exhibited symptoms of dizziness and impaired eyesight. Their urine contained ketone bodies. They were placed on a good alfalfa hay diet and an oat ration which contained the vitamin A and D supplement. All recovered within a few days.

Another flock of 1200 in which heavy losses were occurring was visited. The only feed

consisted of a stemmy, poor grade alfalfa. The natural diagnosis was starvation but there were symptoms of vitamin A deficiency. All animals were emaciated and very weak and a dozen or so dead and dying ewes and lambs were scattered about. Abortions were reported to be numerous. Many ewes were not supplying milk for their lambs which were forced to subsist on creep feed of chopped alfalfa. Defective vision was evident in many ewes. Many lambs were visibly anemic and showed the "bottle jaw" characteristic of this condition. Fatty degeneration of the liver, extreme emaciation and subcutaneous edema and, in some places, muscular edema were seen on post-mortem examination of the ewes.



Meningitis-Ketosis

Four of six lambs brought to the laboratory recovered when fed green hay, oats and vitamin A supplement.

Rainfall during the summer of 1943 was heavy in this territory. Hay growth was lush and rank and haying was impeded. As a consequence the quality of the hay was poor, being especially low in carotene. The frequent reports of weak lambs and pregnancy disease in ewes can thus be partially explained as a vitamin A deficiency. In alfalfa hay stored under practical farm conditions losses of carotene may be serious during summer weather.[3,5] Also the usual method of ensiling results in protein breakdown and fermentation during which carotene is destroyed.[3] This indicates that the basic fodder for winter feeding cattle and sheep is often lacking in carotene. When the winter season is prolonged it is thus not surprising to see manifestations of vitamin A deficiency in livestock. In pregnant ewes this deficiency appears to aid in the production of or brings on the toxemia called pregnancy disease. There is also a heavy loss of lambs in those animals not visibly affected. Hart[3] says that newborn calves have low vitamin A reserves indicating that the pregnant mother on high intake is unable to supply vitamin A to the fetus much faster than it is utilized. Thus the fetus will suffer first when a border line deficiency is reached. According to Schmidt[5] the survival period of sheep on a vitamin A deficient diet varies from 160 to 312 days. Pregnant ewes logically would have a shorter period because of the added drain.

The prompt results secured by the addition of a vitamin A and D supplement in the one flock indicate there is value in the use of these elements in the treatment and prevention of pregnancy disease of sheep. An article by Patton was published while this investigation was in progress. Patton[4] studied the value of vitamin A in treating acetonemia in cattle and stated that the prevalence of acetonemia as a primary ailment is directly proportional to the lack of carotene in the feed and the need for this factor by the animal. According to Patton the symptoms of primary clinical acetonemia closely parallel those of vitamin A deficiency. In pregnancy disease, ketosis or acetonemia is characteristic. The addition of a vitamin A supplement is indicated in flocks where this syndrome occurs, or more important, to aid in preventing it.

The observations made in the flocks described quite closely parallel those made by Vawter in Nevada in a flock of pregnant ewes forced to subsist on sheaf oats.[6]

Summary

A syndrome which is clinically and pathologically similar to pregnancy disease in ewes has been found associated with vitamin A deficiency. Many of these animals responded to vitamin A therapy by a disappearance of the ketosis within a few days and when not in moribund condition, by improvement and in some cases the disappearance of the symptoms of pregnancy disease.

The data obtained strongly indicate that vitamin A deficiency may be a predisposing factor in the production of ketosis in pregnant ewes.

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Lymphocytomatosis in a Young Calf

By KIRK STONEBRAKER
Leavenworth, Kansas

CONDITIONS involving hyperplasia and metastasis of lymphoid tissue occur rarely in very young cattle. Creech and Himsel[1] reported lymphocytoma in a Jersey calf possibly not over six weeks of age. Udall and Olafson[2] reported a case to which they referred as pseudoleucemia, in a six-week's-old Guernsey calf with an involvement of the lymph glands, liver, kidneys and spleen. So far as the writer knows, the calf in the case here reported, is the youngest animal in which the disease has been recorded up to the present.

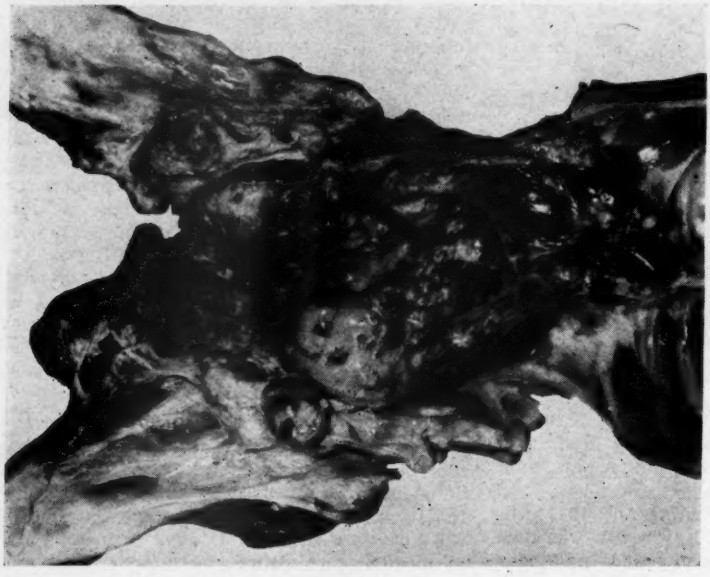

Fig. 1. Mass of tumorous tissue in abdominal cavity, surrounding involved lymph nodes, and white areas of lymphoid tissue on the exposed kidney

History.—This calf was of mixed dairy breeding, reported by the owner to have been seven to ten days of age when he noticed a small, nodular shaped swelling on the right hip. The animal was brought to the veterinary clinic of the Kansas State College December 21, 1943, at the age of six weeks with an enlargement, involving most of the right gluteal region, which the owner thought to be an abscess.

Clinical Diagnosis.—The calf was apparently normal except for the enlargement on the buttocks, enlarged prefemoral lymph nodes and several small subcutaneous nodules in the inguinal region. A clinical diagnosis of probable lymphocytoma was made.

There was no opportunity to observe the calf again until eleven days later. At this time it was unable to stand on its feet and showed, by palpation, a large solid mass in the posterior abdominal cavity. The enlargements previously mentioned showed no appreciable increases in size.

Necropsy.—Marked enlargement and congestion of numerous lymph nodes and the presence of much neoplastic tissue constituted the major gross pathology revealed on post-mortem examination. The following lymph nodes were enlarged to a variable extent: Abomasal, mesenteric, colic, hepatic, prefemoral, supervicial inguinal, external iliac, internal iliac, ischiatic, popliteal, right axillary and suprapharyngeal. The neoplasm in the abdominal cavity apparently involved the sublumbar nodes.

Lymphoid tissue, a result of metastasis, was found in the diaphragmatic and cardiac lobes of the lungs, in the right longissimus dorsi, in the gluteal region, in the spinal canal between the first and second thoracic vertebrae and in the kidneys.

Practically all of the masses of lymphoid tissue showed considerable necrosis at the center and were very friable.

Laboratory Diagnosis.—Blood examination and sectioning of three of the tumors, definitely established the diagnosis of lymphocytoma. Four differential white cell counts were made, which showed average percentages

of cells—eosinophiles, 1%; basophiles, 0%; myelocytes, 0%; juveniles, 0%; stabs, 2.5%; segmented neutrophiles, 49%; large lymphocytes, 1.7%; atypical lymphocytes, 65.5%; small lymphocytes, 1.2%; and monocytes, 1.2%. According to Thompson and Roderick,[3] this per-

Fig. 2. Showing tumor in spinal canal

centage of atypical lymphocytes is highly suggestive of lymphatic tumors.

Two white cell counts averaged 10,200 cells, while two red cell counts averaged 12,000,000

Fig. 3. Showing tumor on gluteal region

cells per cmm. Hemoglobin was normal at 12 grams per 100cc of blood.

The tissue sections, one of which came from the tumor in the spinal canal, showed the presence of numerous lymphocytes having large vesicular nuclei with a large number of mitotic figures. These characteristics of the lymphoid cells indicate a great deal of malignancy and explain the rapid growth of the tumors and affected nodes. Microscopic examinations revealed extensive areas of necrosis scattered throughout the tissues.

Acknowledgment.—The writer wishes to express his appreciation to Drs. W. W. Thompson, E. J. Frick, and W. M. McLeod for much valuable assistance on the case.

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Mineral Deficiencies*

Cattle long restricted upon native forages on any fenced pasture area reflect in their physical condition and performance the nutritive value of the forages and the fertility of the soil. Under extreme shortages of certain of the mineral elements, cattle and other livestock exhibit symptoms indicative of the deficiencies. A craving for objects not considered as feed under normal circumstances is one of the most common symptoms noted. Persons living on soil areas of this kind often become so accustomed to seeing livestock eat or chew on such objects as bones and oyster shells that they consider it normal rather than unusual. Such cattle lose condition, become unthrifty, the hair has a dry harsh appearance and is not shed until late in the season. Affected animals may become stiff, lame or permanently crippled. Cows give less milk, growth is retarded and animals often are weak, stunted and anemic. First calf heifers in lactation and young cattle soon after being weaned, are more often affected than dry cows, bulls or steers. Lactating animals showing evidence of mineral deficiencies often show improvement after being turned dry, since the drain of mineral elements in milk production is discontinued.

Parasitic infestations may coexist with conditions brought about by mineral deficiencies. The blood of animals suffering from mineral deficiencies may be pale in color, having a low hemoglobin content. The volume of blood may be reduced. The spleen of mineral deficient animals may be atrophied, consisting mostly of connective tissue or trabeculae. The heart muscle is flabby and lacks tone. Bones of mineral deficient animals have thin shaft walls, and show incomplete calcification. The ribs are usually flexible and easily broken.

Various mineral supplements may be added to the ration, or made available in mineral boxes, to overcome the deficiencies. Mineral mixtures containing calcium, phosphorus, iron, copper and cobalt usually are supplied. The problems of mineral deficiencies in livestock need further investigation.

*Notes from a discussion by D. A. Sanders at the 13th Annual Conference for Louisiana Veterinary Medical Association, conducted by Louisiana State University and A. & M. College, Baton Rouge, Feb. 16-17, 1944.

★ ★ ★ BUY WAR BONDS ★ ★ ★
AND HOLD THEM

Autobiography of a Veterinary Practitioner

By E. T. BAKER, Moscow, Idaho

XXV

Practice in War Time

ON SUNDAY morning, December 7, 1941, when Pearl Harbor was attacked, I was out in the country vaccinating a bunch of cattle with hemorrhagic septicemia bacterin. These cattle were as wild as a grass widow out with a sailor, and I was glad to get home. I was greatly surprised to find my wife "froze" to the radio. When she told me the tragic news my temperature rose several degrees. At that time, our son was in the army, stationed at Honolulu. However, he escaped injury. He is now somewhere in the Pacific area. And so the war came to us, as we had been repeatedly warned it would come.

A practitioner learns to be prepared for anything in his constant struggle with disease in animals, and he looks at things from a realistic viewpoint. We cannot put down an epidemic of rabies by merely reading the Ten Commandments to dogs running at large, or handle a large, vicious horse by stroking his mane.

We educated Japs at our universities, and even at our military and naval academies. We allowed Japanese "fishermen" to sound our coasts and officers, in the guise of tourists, to map and photograph anything they desired. Having been a resident of the Pacific coast region for the past 35 years, I feel much more strongly on this subject of the yellow peril than veterinarians living in the East or Middle West.

The Japs are tough, tricky and inured to hardship. Their standard of living is decidedly different from ours. I have talked with many Japanese students, and they discussed many matters with utmost frankness. They admitted the truth of Kipling's famous statement:

"Oh, East is East, and West is West, and never the twain shall meet."

But so much for international affairs. We are in war up to our necks as this is written and the only thing now is for all to jump in and do all we can to win as soon as possible.

On the Home Front

The most striking thing I have noticed about my own practice since this war began is the increase in cash collections. Also, many of the cases are easier to handle, for, when a stock owner has money in his pocket or in the bank he calls a veterinarian sooner than if he is three years behind in his taxes. Then, too, high prices for animals always help veterinary practice. I have marked off a number of old accounts, for there are a few people left in the financial condition of the woman who wrote into a government bureau saying:

"I am a widow and four children and, just before my husband left for camp we was married to a justice of the peace. Both sides of our parents are old and poor, and I have been in bed three months with a doctor."

Trying to collect an old, mummified bill is like a lawyer explained what a contingent fee means:

"There is no fee for me in case I fail to collect," he remarked, "and if I do there is nothing for you."

The livestock in our county has nearly doubled in the past two years, especially cattle, sheep, hogs and poultry. While we have noted no wide spread epidemics, common ailments have increased greatly. This may be due to a lack of proteins and other vital essentials in the rations.

So far, with few exceptions, the prices of drugs, instruments and biologics have not increased much. Perhaps, the practitioner with much hog cholera vaccination feels the "rise" more than others. Drugs containing alcohol, and some that are imported have increased in price or have become almost unobtainable. However, the resourceful practitioner will surmount these obstacles. Taxes and general overhead have shown a decided rise.

I have never been a believer in radical price or fee changes. To live in one community year after year and build up good will and a permanent business is far better than to try to make a lot of money, and have the enmity of most people. In war time especially, one should

merely try to keep out of debt; buy some war bonds, and after that come out about even. When we think of our service men and women risking their lives for the pay they receive, we can be contented with our regular income. We have never had the idea that the main purpose in war was to make more money.

We feel sorry for the practitioner who has fallen into the habit of using only the most expensive lines of therapeutics, and who is rough or careless with his equipment. As I have stated many times, if I can save $5 or $10 by oiling my grips and instruments and keeping them in tip-top shape, that is just the same as going out in the mud or the snow and making $5 or $10. Proper care of equipment, as well as one's shoes and clothes, not only cuts down on the overhead, but is also true conservation. No one can do this but oneself.

Some Lines of Treatment

When the practitioner learns by heart two fundamentals such as the following:

1. *The cornerstone of veterinary medicine is correct diagnosis.*

2. *We do not cure disease, we merely assist nature.*

Then he will be a more valuable man in his community.

These are the reasons why there will never be a dearth of work for our profession. We have answered over 30,000 questions along veterinary lines for large farm papers, and our usual answer is to "consult your local veterinarian." Perhaps, in the long run, home treatment has killed about as many patients as it has cured. Many a victim, too fractious to handle, owes its present existence to this phenomenon.

In war time we have to deal with a new category of deficiencies not evident, as a rule, in normal times. For example, several puppies I had immunized against distemper were brought to me "gosh-awful sick." My first thought was that it was a vaccination break but, when older dogs, up to 10 years of age, were brought in with much the same symptoms, I began to wonder. Nearly all the histories revealed a diet of "no raw meat." In fact, with rationing, many pooches had not had a bite of any kind of meat for months. Here, the use of vitamins and proper diet remedied the trouble.

The same applies to larger animals, for a lack of proper or natural food, with a deficiency of proteins, may devitalize the patient to a dangerous degree.

With these new conditions confronting us, we must, as general practitioners, do the very best we can with the means at hand.

Equine Therapeutics

Most of my equine work now consists of emergency calls to see colics, founders and impactions. An occasional case of azoturia is seen and, in summer, some wire cuts, navel-ill, and dystocia may occur. Hoof troubles are always with us, and during the winter some dental and "bot" work comes along. Where our once numerous cases of fistulae, influenza and skin troubles have disappeared to, we do not know. About the only owners of horses left are the "little farmers," with only a few acres to cultivate, who own one or more teams. These men usually take good care of their animals.

We use capsules, as a rule, in administering oral medicines, with much hypodermic and intravenous therapy. We leave various combinations of oils and aqueous solutions for the owner to use. The latter dearly loves to "doctor hosses" even if he does get more medicine on himself than into the patient.

The longer I practice the more I see the value of individualistic skill in handling the case at hand. For that reason, I cannot suggest to the practitioner in Maine or Florida what to use in his practice. He has entirely different problems to cope with. Different feeds, care and breeds all play a prominent part. That is why various state associations are so helpful, for a few practitioners can sit down in the lobby and compare notes with the utmost freedom. I have almost gone to sleep at large meetings where some speaker droned on and on about some pet ailment entirely unknown in my territory.

Bovine Ailments

Perhaps most of us depend more on this class of work than on any other. As I look back 30 years I am astonished at the progress made along these lines. The addition of recent ruminatorics antiseptics and biologics has greatly widened our horizon, and the coming years will show some wonderful strides in the control of such maladies as mastitis and brucellosis.

Again, in treatment of cattle, one should always be cautious about making a favorable prognosis, and prepare the owner for any contingency. Several years ago I treated a Guernsey cow for milk fever. The owner was a good friend of mine, and as I concluded the treatment he said:

"She'll be O.K. in the morning, Doc; you ain't never lost a case for me yet."

"Well, don't be too sure," we replied, "for she won't be out of danger until she gets up and is eating."

The next morning a very surprised voice called up:

"Doc, that cow kicked the bucket last night; what in Sam Hill do you suppose killed her?"

We drove out and posted her and found half a blade from a mowing machine sickle entering her pericardium.

Such new agents as lentin, stilbestrol, hormone solutions and the like and, of course, the sulfa drugs, have enlarged our field of activities, and made our services of more value to our clients.

Sheep Problems

As stated many times before about all a practitioner needs to know about the common run of sheep troubles in his community is the following:

What are your common breeds and your principal feeds? What are your everyday noncontagious diseases and what infectious maladies may occur? What are the common parasites and what poisonous plants are found in your locality?

Becoming familiar with this small fund of knowledge should not overtax the average brain, and it will pay good dividends.

Goat Practice

It is surprising how many queries regarding goats are received during the year. Many small families living in towns or suburban tracts keep one or more goats for the milk supply.

Most goat troubles are similar to those of the dairy cow. We have found that if a ration of whole oats, bran, iodized salt, alfalfa and a little bone meal is given, remarkable results often occur. In mammary troubles, small doses of sodium thiosulphate may prove beneficial. For a goat to give a "good mess of milk" on a diet of thistle salad is expecting too much of even the butt of some of our most successful jokes.

In some sections, where the production of mohair is an important industry, the proper care of the Angora is of vital importance.

Swine Troubles

My practice has turned several handsprings when it comes to swine ailments. Before the drouth years and before any large numbers of middle west hogs were shipped out to the northwest, the average farmer paid little or no attention to his pigs. His sows farrowed in the spring; in the fall he placed the shoats in the fattening pens, and that was about all there was to it. Once in a great while a young gilt would die from difficult farrowing, or some pig pick up a little poisoning, or suckling pigs get the thumps from roundworm infestation, but that was about all. Cholera was very rare; erysipelas unknown; enteritis and flu nonexistant and, with the exception of the ever present lice, skin troubles were unheard of.

But, during the past 10 years our swine raisers seem to have been plagued by every new and fancy disease known. When I asked one anxious breeder what seemed to be his principal trouble, he answered mournfully:

"Gosh, Doc, it's everything."

Small Animal Work

Every general practitioner has more or less of this work to do. Vaccinating and spaying puppies; suggesting proper vermifuges; treating skin diseases; occasional dystocia and auto accidents comprise the bulk of our work. In the past few years we have passed up most of our spaying cases, as a college veterinary hospital is nearby.

Cats are a valuable animal on the farm, and one is asked many questions about the more common maladies, such as ringworm and cat flu.

Rabbits are becoming more and more popular as a food animal, and are subject to many ailments. From a meat inspector's standpoint, it is evident that if producers would dress their rabbits and cut them up ready for the stove, they would sell many more than they do. "Fryr-pack" dressed rabbits will sell far more readily than those dressed "whole," and resembling a skinned cat in the market.

Here again, the practitioner can be of value in suggesting proper rations and sanitation. As a rule, it does not pay to doctor extremely sick animals, for they may only infect others.

Pets, such as canaries, gold fish, ferrets, white rats, racecoons, badgers, and fur bearing animals, such as mink or fox, may all come under our attention at rare intervals. Poultry is assuming importance in our practice.

On the Alert

Being on the job is another prime requisite at all times, but especially now. Prompt treatment may save a bloated cow, or a bleeding horse that might be lost by a slight delay. And, too, it might mean earlier recognition of an outbreak of a disastrous epizootic.

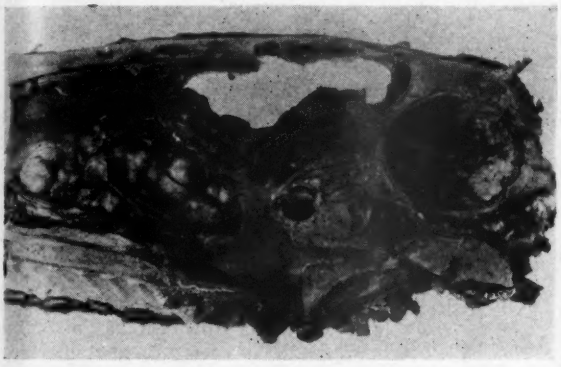
Without any fanfare, the average practitioner is going about his business doing good work and getting along the best he can. He will be found to be an average American; living in an average American home; having one or more boys and girls in the armed forces and going on calls day or night, through snow and rain, without complaint. He longs for the day when this conflict will be brought to a victorious conclusion, and our country can resume its normal ways of peace. And that neighbor boy, who smiled and waved goodbye, but who now rests in eternal slumber in some faroff place—it seems strange we will never see him again.

(To be continued)

Clinical Reports

Carcinoma of the Eye of a Horse

October 1, 1943, an eight-year-old black Percheron mare, in rather poor condition, was presented for treatment. The history was very obscure as the owner had purchased this mare at a community sale, three weeks previously. At that time the right eye was missing and a slight swelling was noticed on the right side of the head. The swelling had increased rapidly with edema of the nose and lips accompanied by slight dyspena and progressive depression. The preceding evening a severe hemorrhage had started from the right nostril which seemed to give some relief to the animal, but the owner was unable to check the hemorrhage. There was a fetid discharge from the eye socket and the head was held in a lowered position most of the time; when moving she had a tendency to walk in a circle.



Median view, right half of head of horse

Upon examination, the eye cavity was found to contain screw-worm larva (cochliomyiasis), which were flushed out with a 1-50,000 chlorine solution and a camphor phenol solution applied. Five hundred cc of calcium gluconate was given intravenously to control the hemorrhage. The mare died three days later.

Necropsy revealed an extensive neoplastic growth, completely filling the frontal, maxillary and sphenoid sinuses, right side of the nasal turbinates, pterygoid, masseter and other cheek muscles. It had involved the occipital, sphenoid and parietal bones, (they crumbled when sawed) entered the cranial cavity and pressed on the brain.

Microscopic examination of the tissues proved the growth to be a carcinoma. It is logical to think that this was an extension from a carcinoma of the ablated eye.

CLIFFORD E. DUNCAN.

Manhattan, Kans.

* * * *

Dystocia, Superfetation, Enteritis

I was called to see a 1600-pound parturient draft mare. She had a complete eversion of the bladder and it was filled with strangulated intestines. One foot of the foal had been forced through the recto-vaginal septum and was protruding from the anus. The mare was nearly dead from shock and the owner consented to having her put out of her suffering. A necropsy was held.

An entirely dependable client came to the office recently with the following story.

Seven months ago a sow that he owns gave birth to three live pigs and three mummified fetuses. The live pigs did well and three weeks later he noticed her attempting to farrow. He was able to reach and with little difficulty pull out a live pig. The next morning the sow had two additional pigs in her nest. She suckled all six pigs and all grew normally.

A few months ago I was called to see a grade Hereford (¼ Jersey) heifer about one year of age. She had a distinctly dead odor. The thermometer revealed but slight rise in temperature. She commenced to strain and to pass a perfect cast of the small intestine. By pulling on it gently a section more than eight feet long was removed.

A cathartic and intestinal antiseptic was administered and the next day the owner reported an additional 14 feet of her "bowels" as he called it was passed. Recovery was complete in a few days. I think this must be about the record for a false membrane due to diphtheretic enteritis.

F. H. BEGGS

Morganfield, Ky.

Avian Osteopetrosis in Antigua

The purpose of this note is to record, for the first time, the observance of the Osteopetrotic form of the avian leucosis complex amongst poultry in Antigua, B. W. I.

This is a form of lymphomatosis and is considered rare as compared to the neural, ocular and the visceral forms. The three latter have been observed frequently amongst poultry on this island.

The condition of osteopetrosis has been commonly termed "marble bone." It is manifested clinically by a condition in which the long bones (leg and wing) are both thickened and enlarged in their transverse diameter without any corresponding increase in length.

Lympnomatosis in a Rhode Island Red cock

The skeletal changes have been shown to comprise a gradual replacement of normal bone formation by amorphous deposits of lime salts with marked reduction of the lumen of the marrow cavity. The excessive hardening of the bone is without doubt associated with these abnormal lime deposits.

The subject of this report was an eight-month-old New Hampshire cockerel (Fig. 1). This bird had been hatched from a flock which was known to be infected with the neural and ocular forms of lymphomatosis. The owner reported that the bird had never done well; was subject to periodical colds and, in spite of good feeding, did not gain in weight.

Clinical examination disclosed (1) a bird in poor condition, (2) a noticeable loss of iris pigment, although not to the extent of that associated with the true "gray or pearly eye" and (3) gross involvement of both metatarsi, evidenced by considerable thickening and distortion of these bones. This condition had also extended slightly to the digits.

Permission was obtained to make a post-mortem examination on the bird and this disclosed the following: (1) a very poorly fleshed carcass with pale musculature, (2) no visceral changes with the exception of a small tumorous mass involving the anterior border of the right kidney and (3) no changes in the wing bones; slight swelling of both tibiae and considerable enlargement of both metatarsi. These, on being sectioned transversely, were found to be exceptionally hard and the lumen of the marrow cavities was considerably reduced.

Acknowledgement.—Thanks are expressed to Mrs. R. Cadman, St. John's, Antigua, for making the bird available for pathological study.

L. R. HUTSON*

Antigua, British W. Indies

* * * *

Mastitis†

During the present emergency the United Nations are confronted with responsibility of protecting and increasing their food supply. This is necessitated by needs for food for the civilian populations of the Allied countries; for their armies on the far flung battle fronts throughout the world; and for the peoples of those countries freed from the despotism of the aggressors.

In connection with the food for freedom program the control and eradication of livestock diseases is of preeminent importance. Bovine mastitis is considered to be the most widespread and destructive disease of the dairy cattle industry. That it is the most important single factor operating to interfere with the goals set in our dairy products food program is widely recognized.

The prevalence of mastitis in our dairy herds is of vast economic importance aside from its direct influence on the war effort. Bacterial infections of the udder invoke the presence of: clotty milk, blind quarters, frequent flare ups, low production, low financial income, high bacterial content of the milk, low quality fluid milk from which smaller amounts of cheese, butter, ice cream or other products may be processed, possibility of milk borne epidemics and responsibility of preventing or checking such epidemics.

All attempts to induce mastitis by the introduction of organisms through the mouth, eye, skin wounds or intravenous injections have failed. Any conditions which favor implantation and retention of virulent bacteria around the external teat opening or inter-

*Chief Veterinarian, Leeward Islands, B. W. I.

†Notes from an address at the 13th Annual Conference for the Louisiana Veterinary Medical Association conducted by the Louisiana State University and A. & M. College, Feb. 16-17, 1944.

fere with the normal functioning of the teat sphincter may facilitate udder infections. Injured teats, scratches, bruised or chilled udders, cuts, sores, abrasions, chapped teats, cow pox and similar conditions create conditions favorable to development of bacterial infections of the udder.

The causative organisms of mastitis are shed in the secretion of infected udders. These organisms contaminate the hands of milkers and teat cups of the milking machines thus aiding the spread of infection to susceptible udders. The spread of udder infections usually is a slow and gradual process. In herds where a fair degree of sanitary precautions are not practiced the disease may spread rapidly. Unclean methods of hand milking, improper cleaning of the teat cups and failure to isolate or milk infected cattle last, contribute to the spread of mastitis.

Since a drop of milk to which flies are attracted commonly is left at the teat orifice after milking, these insects become agents in the transference of organisms from infected to non-infected animals. The horn fly, *Haematobia*, spp. by its habit of sucking blood from the tissues of the teats and adjoining surfaces of the udder of young heifer calves, often produce hemorrhagic lesions, erosions, excoriated areas and eschar formations on the tips and sides of the teats and adjacent parts of the udder. Many of these heifer calves of beef and dairy breeds freshen with blind quarters, have fibroid and asymmetrical udders, deformed teat sphincters and abnormal udder secretion. Mastitis organisms may be isolated from the surface of these lesions in young heifer calves and from their udder secretion before and after calving.

The mastitis problem may be successfully attacked by adoption of a carefully planned control program, based upon the individual needs of each herd as determined by the veterinarian. These measures usually include employment of hygienic measures in the milking technic, the practice of general principles of sanitation in the barns, or milking sheds and in the general environment of the dairy herd, by the use of a sound system of herd management and treatment of diseased udders to prevent spread of the infection.

The principles involved in the practice of sanitary precautions for mastitis control are simple, but adoption and application of these principles require competent supervision by an alert and interested individual.

The careful cleansing of udders before milking is an aid to the mastitis control program, so also is use of the strip cup, the Hotis test, microscopic examination of the milk, palpation of the udder, prompt removal of infected animals from the milking line, sanitary safeguards in the use of the teat cups of the milking machine by dipping in chlorine solution before its use on each cow, cleaning and sterilizing the teat cups after each milking period. Careful washing of the hands before milking each cow will aid in preventing spread of infection in hand-milked herds. These and other sanitary precautions and proper methods of herd management should be maintained in all dairies regardless of the presence or absence of mastitis infections.

Unprofitable and incurable animals having marked udder fibrosis should be removed from the herd. Infected udders which appear suitable for treatment may be treated by means of udder infusions or udder injections. Treatments of udders are most likely to be successful in those herds where strict sanitary control measures are adopted.

The application of these hygienic measures as a control program in herds affected with mastitis prevents further spread of the disease, reduces the incidence of inflamed quarters, lowers the bacterial content of the milk, preserves and, in many instances, restores the productiveness of valuable dairy cattle and contributes to the food supply of the nation.

D. A. SANDERS

Gainesville, Florida

Torsion of the Cecum in a Calf

On the evening of March 10, 1944, a call came to the office to attend a calf that was bloating.

Upon arrival I found a bucket-fed, three-week-old Brown Swiss calf, very much bloated, in fact, so severely bloated as to cause a marked dyspnea. At once a colt-size stomach tube was passed and the gas escaped from the calf's stomach. To try to prevent further formation of gas, a commercial antiferment was given which consisted of a solution of camphor, salicylic acid and oil of turpentine. For a short time this gave some relief, but the intestines continued to give a very decided tinkle upon percussion. In a short time the calf was considerably worse, probably due to stirring about and to the absorption of some of the gases. An intravenous injection of 200cc of 25% dextrose failed to halt the increasing toxemia, and the calf died in about 20 minutes.

Questioning the owner revealed that three or four days previously the calf had developed a severe diarrhea. He had administered some of a 50-50 mixture of tannic and salicylic acid, which had previously been prescribed by a veterinarian for another calf. Since this mixture either failed, or had not had time to become effective, the owner decided to try

something else, and that morning gave the calf five large tablespoonfuls of castor oil.

It was decided to hold a necropsy. An incision was made down the midline of the abdomen and at once a large volume of gas filled intestine rolled upon the floor of the barn. The cecum, mesentery and about 10 feet of the small intestine were of a deep brick red color. The intestine was extremely distended with gas anterior to the cecum but there was no gas in the intestinal tract beyond it. Upon manipulation the cecum suddenly spun around and the gas pressure was quickly equalized throughout the intestinal tract. In restoring the cecum to its previous position, it was discovered that the twist constituted a complete, 360-degree torsion. This explained the stoppage of the gas and also the red appearance of the cecum and posterior portion of the small intestine due to interference with the circulation. Further examination revealed no other pathological lesions.

Upon showing the owner what had happened and telling him that regardless of any treatment the result would have been the same, he seemed satisfied. It was explained that probably the castor oil had increased the irritation already present and produced such an intense peristalsis as to cause the torsion. I believe that hereafter he will consult a veterinarian and not again use castor oil in treating calves with scours.

EDWARD BARDSHAR

Mt. Hope, Kansas

Traumatic Gastritis in a Sow

A sow, two years of age, was brought to the post-mortem room January 15, 1944. She had been bred two months previously and was in good condition. The client stated that the hog had been sick for the past four days and had not eaten during that period. She vomited the first day of sickness, was depressed, isolated herself from the others, but was fairly active at times and did not appear alarmingly sick.

Post-Mortem Findings: Her stomach contained several pounds of corn-chop notwithstanding the statement of the owner that she had not eaten for the period of illness. There were approximately two quarts of straw-colored fluid in the abdominal cavity and a hydrothorax of about the same amount. The lungs were edematous but not inflamed and the liver and spleen were one-half again normal size. Adhesions had formed between the stomach and the liver, over an area five or six inches in diameter. The stomach wall was thickened to three-fourths of an inch at the site of the adhesions. In the center of this area of adhesions a stick, three inches long and one-fourth inch in diameter, had penetrated the stomach wall and entered the liver, causing necrosis of that organ for three inches all around the foreign body.

ROBERT B. MICHAEL

Waterman Canyon, San Bernardino, Calif.

Pyometra in a German Shepherd

A twelve-year-old German shepherd bitch whose last litter of pups had been whelped eight years previously, was brought to the clinic for treatment, October 4, 1943. Three months earlier the owner noticed a slight discharge from the vulva. This discharge had gradually increased.

Palpation revealed an enlarged uterus. A

diagnosis of pyometra was made, which was verified by fluoroscopic examination. There were three adenocarcinomas of the mammae and a tumor on the skin just below the vulva which involved the lower commissure. Because of the heat of the season the owner did not want to subject the dog to two operations, so a hystero-oophorectomy was performed. The uterus contained approximately two pints of chocolate-colored pus. There was a small circumscribed tumor on the right horn about three inches from the bifurcation.

The dog was sent home with instructions to give her a 5-grain tablet of sulfathiazole three times a day for five days, and to return her once a week for three weeks for examination. On the third visit the adenocarcinomas were surgically removed from the mammae. An uneventful recovery followed.

PHILIP D. CAZIER

Kansas City, Kans.

The Million Dollar Quackery

A Quack is defined as one who claims to have medical skill which he does not possess. For more than two years several publications speaking for the drug industry engaged in the manufacture and distribution of veterinary bacterins, serums, vaccines and udder infusions, have carried on an extensive campaign to the end that the drug stores should take over the sale and distribution of these products, and so reap a harvest and cash in on what they estimate a $70,000,000 annual business with the livestock and poultry growers. Some of these firms have representatives that travel through the country in company with the local druggists, and solicit the sale of these products direct to the farmers, dairymen and poultry growers. Some druggists are attending meetings where they claim to receive expert instructions on how to treat livestock diseases. Thus they become proficient in diagnosing all animal diseases by listening to some "expert" for an hour or two. By this scheme every rural druggist would be an animal disease "expert."

The absurdity of this program is evidenced by an article in the "American Druggist," Nov., 1943, under the headline, "Even the Fountain Help Know About Animal and Poultry Health Products." It is the story of a Kansas druggist who gave his clerks, including high school girls behind the soda fountain, a thorough course of instruction in selling animal and poultry health products. As a result, his clerks can talk "turkey," animal or chicken troubles and sell serum to his farmer customers as easily as they can concoct an ice cream soda.

Why should one spend four or five years in study in a veterinary college, when one can obtain all this information in an hour or two in listening to one of these "experts"? Many farmers have become so vaccination minded that they want to vaccinate for everything. This has prepared a rich field for the quack and the unscrupulous manufacturer of animal medicines. The farmer has been informed that anyone can use a hypodermic syringe. Certainly, that is true. It is also true than anyone can pull the trigger of a dangerous rifle, shotgun or revolver, but either of these instruments are dangerous weapons when in hands of those who do not know where, how or when to use them. Many thousands of poor animals have been stabbed so often with that old hypodermic needle that it takes a mighty strong stanchion to hold them when one comes near them. Veterinary serums, bacterins, vaccinees, udder infusions and hypodermic syringes are useful in treating and preventing diseases in live stock, only when used by those having the proper knowledge where, how and when to use them, and this knowledge cannot be obtained by listening for an hour or two, to some "expert" on livestock diseases.

After the revolution in Russia, an extensive livestock production campaign was launched without sufficient trained veterinarians to safeguard it. As a result, disease destroyed much of their livestock and years of famine followed. Russia realized her mistake, about faced, established 25 veterinary colleges, which graduated 1250 a year, with a goal of 50,000 trained veterinarians. Before the present war broke out, Russia was rapidly becoming one of the best fed and best clothed nations of the world.

It has been stated that the veterinary profession is opposed to "quackery" for selfish reasons, when nothing is further from the truth. Veterinarians want to eradicate and control diseases wherever possible. The whole history of the profession is ample proof of this. The backbone of any country is the livestock industry, and the veterinarians are the effective safeguard from livestock diseases. Many contagious and infectious diseases of livestock, the management of which have been left to the veterinary profession, have been brought under control. Outbreaks of foot-mouth-disease and contagious pleuropneumonia, have been eradicated. Glanders, dourine, bovine tuberculosis, tick fever, cattle scab and others have been practically eradicated. Diseases such as mastitis, swine erysipelas, hog cholera, rabies and others can be controlled. The veterinarian will do his part —the leading part if permitted. All the profession asks is the cooperation of the livestock industry in hitting the "quack" where it hurts him most, and that's in his pocket book.

B. ROYER

Shawano, Wisc.

Abstracts

Vegetable Protein for Growing Turkeys

Hammond[20] *et al.*, as a result of a feeding experiment with 16 lots of turkeys comprising 640 birds concluded: "that it is not only possible but highly practicable to raise turkeys on diets containing no animal protein." The cost per pound at marketable age was less on vegetable protein diets than on the commercial mashes heretofore used. "Simple vegetable protein diets produced as large turkeys on as little feed as did the control diet which contained dried skimmilk, meat scrap and fish meal."

The chief protein supplement used was soybean meal. The manner of processing the meal is important. It must be heated but not overheated for good results.

Septic Sore Throat Due to Reconstituted Milk

Epidemics of septic sore throat, traceable to contaminated raw milk are not rare; in fact most epidemics of septic sore throat are so traceable. It remained for Allen and Baer[21] to trace such an outbreak on a naval vessel to a contaminated "mechanical cow."

This outbreak illustrates forcibly the need for the same sanitary control for milk reconstituting equipment ("mechanical cow") as for other milk processing facilities. The naval officers make the following recommendations for the safe operation of milk reconstituting equipment on ships. The directions are in the main applicable to the operation of fountain mechanical cows, which are promised to be as numerous as are drug stores after the war.

1. Foremost in importance is careful instruction of enlisted personnel operating the machine and continued close supervision of their work.
2. Sufficient men should be assigned to the job and an adequate number of "mechanical cows" obtained to supply the needed quantity of milk without having to "railroad it through."
3. A thorough breakdown of the mechanical cow is necessary daily with careful scrubbing of all parts with alkaline washing powder followed by steam sterilization for at least one minute.
4. Weekly checks with a standard thermometer of both the pasteurizing and cooling temperatures is essential. A recording thermometer attached to the mixing tank of the mechanical cow is desirable.
5. Particular attention should be paid to keeping milk cans clean along the seams and prompt retinning of those that rust.
6. Careful screening and adequate ventilation are important and often overlooked items of sanitation.
7. Drying racks for the milk cans of approved construction are easily made and should always be used. Too often cans are placed upside down on the deck.
8. Bulkheads should be kept painted white to encourage cleanliness and expose dirt.
9. Frequent checks on the health of all milk handlers is an important duty of the medical officer.

Prevalence of Samonella Infections in Man

In an examination of fecal discharges of patients in state hospitals in the Chicago district, Felsenfeld[25] and Young of the Central Enteric Laboratory found 64 persons haboring 19 types of *Salmonella* and 281 persons harboring 13 types of *Shigella*.

S. shottmuelleri, human strain, was found in four carriers and *S. shottmuelleri*, animal strain, in an equal number.

S. typhimurium was found in 10 cases (including nine cases of food poisoning) and eight carriers.

S. enteritidis was isolated from two patients.

S. pullorum was isolated from six cases of diarrhea, with a history of repeated attacks over a long period.

Other types of *Salmonella*, less common in infections of both man and animals, were found mainly in small numbers of carriers.

Anaphylactic Shock in Dogs

Two hundred and forty dogs were sensitized to horse serum,[27] each animal receiving equal amounts of antigen by intravenous and subcutaneous injections on the same day. The animals were anesthetized 16 days later and were tested intravenously with varying amounts of horse serum administered at a uniform rate. The degree of anaphylaxis was measured by the amount and duration of the fall in blood pressure. The dogs varied in their susceptibility to anaphylactic shock. Although the technic of sensitization was the same in all the animals, the severity of the anaphylactic reaction was not proportional to the size of the shocking dose. It was impossible to foretell the dose which would be fatal to all the animals. It was concluded that dogs vary widely in their susceptibility to anaphylaxis and that the value of any inhibiting

[20]Hammond, John C., Haynes, Sheppart K., Marsden, Stanley J. and Titus, Harry J. Vegetable protein diets for turkeys. *Poul. Sci.*, 23:2, pp. 105-109, 1944.

[21]Allen, M. C., U.S.N., Lieut. Ralph F., and Baer, M.C., U.S.N., Lieut. Louis S., Outbreak of septic sore throat due to reconstituted powdered milk. *J. Am. Med. Assn.* 124:17, pp. 1191-93, 1944.

[25]Felsenfeld, Oscar and Young, Viola Mae. The occurrence of members of the genus *Salmonella* in inhabitants of the Greater Chicago area. *J. of Lab. and Clin. Med.* 29:4, pp. 375-382, 1944.

[27]Dragstedt, C. A. The relation of the dose of antigen to the degree of anaphylactic shock in dogs. *J. Immun.* 47, p. 505, 1943.

agent cannot be accurately determined by pitting it against what is assumed to be a uniformly fatal dose of antigen, in a small number of sensitized animals.

Salmonellosis Caused by Ingestion of Ducks' Eggs

Snapper[22] directs attention to the fact that outbreaks of paratyphoid fever C and allied types of salmonellosis may occur if raw or insufficiently cooked ducks' eggs are used in the preparation of ice cream, sauces, puddings, pies or mincemeat, foods that may be put away for hours before they are consumed. Salmonella organisms may multiply rapidly and infection of persons eating the foods may result. In the United States ducks' eggs, fresh or storage, are rarely used for human consumption and salmonellosis of this source is therefore rare. However on duck breeding farms, tons of eggs unsuited for incubation are salvaged as frozen eggs and later used in pastries. Apparently the Salmonella organisms or most of them are killed in the processing. In the Orient, particularly in China, ducks' eggs, fresh or stored, are widely used and this may be a factor in the frequent occurrence of salmonellosis in that country.

Prevention and Treatment of Maggot Infestation

Monnig[24] enumerates the following characteristics as essential to a preparation for the ideal treatment for maggot infestation in sheep.

1. It should be stable.
2. It should possess sufficiently low viscosity and surface tension to enable it to penetrate readily into a strike wound and into the surrounding fleece.
3. It should not damage the fleece and it should be easily removed in the industrial process of scouring.
4. It should resist atmospheric decomposition after application to the sheep and should not be removed readily by rain or urine.
5. It should be a contact larvacide and should kill 100% or very nearly 100% of the larvae in the wound.
6. It should be non-toxic to sheep.
7. It should promote rapid healing of the strike wound.
8. It should prevent restrike both during the healing process and subsequently.
9. If an aqueous solution it should be easily prepared by adding water to the solids.
10. It should be inexpensive.

After long experimentation the author evolved such a preparation with the following formula:

Alcohol (96%)	400.00 cc
Mineral Oil (S.A.E. 60)	50.00
Mineral Oil (C.I. fuel)	100.00
Cresol*	25.00
Sulphuric acid† (commercial)	1.50
Benzol	211.75
Neutral Creosote oil**	211.75
	1,000.00 cc

Vitamin E and Reproduction in Dogs

It has been shown that dogs can be raised and maintained for long periods on mineralized raw milk[28] but when evaporated milk is fed under the same conditions all pups born to such dogs die within five days after birth.[1] In a report of a three-year study of this phenomenon Elvehjem, Gonce and Newell[2] found that evaporated milk supplemented

with iron, copper, manganese and codliver oil supports normal growth in dogs and permits reproduction, but all puppies born to bitches so fed also die within five days of birth. The administration of 25mg of α-tocopherol per week during gestation did not correct the difficulty, but when this was increased to 40mg per week the puppies lived.

This and other tests convinced the authors that the loss of puppies was due solely to a difficiency of vitamin E in the diet of the mother during the gestation period. Raw milk which was aerated in the presence of iron (which destroys vitamin E) had the same effect as the evaporated milk—the puppies died within five days.

[22]Snapper, I. Salmonellosis caused by the ingestion of duck eggs. *Am. J. Digestive Dis.* 11:1, p. 8, 1944.

[24]Monnig, H. O. Sheep blowfly research VI—The treatment of myiasis. *The Onderstepoort J. Vet. Sci. and Animal Ind.*, 18:5 and 6, p. 73.

*In practice the neutral creosote oil is washed free of cresols only so far as to leave about 12% which gives the correct proportion in the final mixture, and therefore no other cresol is added.

†The sulphuric acid is first mixed with the alcohol and the other ingredients then added to this mixture.

**Boiling point 200-240° C. (392-464° F.)

[28]Patter, V. R., Elvehjem, C. A., and Hart E. B., *J. Biol., Chem.*, 126, p. 155, 1938.

[1]Anderson, H. D., Elvehjem, C. A., and Gonce, Jr., J. E., *J. Nutr.*, 20, p. 433.

[2]Elvehjem, C. A., Gonce, Jr. J. E., and Newell, G. W. The effect of vitamin E on reproduction in dogs on milk diets, *J. Pediatrics*, pp. 436-441, 1944.

Book Reviews

Pattern for Penelope. By *Mary Wolfe Thompson.* 276 pages. Published by Longmans, Green & Co., New York and Toronto; 1944. Price $2.25.

This is a story that does for veterinary practice with pet animals what "Dutch Vet" did for general veterinary practice including meat inspection, i.e., informs the reader—entirely incidental to fiction the main purpose of which is entertainment—of aims, achievements and methods of veterinary medicine.

The central figure of the story, Penny Austin, a city girl, on graduation from high school, is forced by poor health to defer going to college for a year and to spend the period at her uncle's home in a village. Her uncle operates a first class small animal hospital which is a *terra incogniti* to Penny. In the course of her orientation the reader is given much accurate information concerning a veterinary hospital and veterinary practice. Penny proves an apt pupil. Her first interest is in dogs as companions and she trains an Irish Setter and exhibits her successfully in obedience contests. As time passes her interest in the hospital increases. When her uncle's lay assistant is taken into the Army she takes his place. She dreads to return to the city as the year draws to an end, but again the War intervenes in her affairs and she is enabled to continue as Doctor Drake's assistant, work that is thoroughly enjoyed.

"Pattern for Penelope" is well written, the sequences are logical, the portrayal of veterinary practice accurate and friendly. The work is eminently suited for a veterinarian's waiting room table, for a gift to selected patrons and, of course, every member of every veterinary family will want to read it.

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Useful Bulletins, Circulars, Etc.

Control of Sheep Diseases.—Circ. No. 212, Kansas Agri. Exp. Sta., Manhattan.

Diseases of Feeder Cattle.—Circ. 220, Kansas Agri. Exp. Sta., Manhattan.

Vitamins in Common Foods.—Division of Home Economics, Bul. No. 11. Kansas State College, Manhattan, Kans.

Our Equine Friends.—Booklet by Wayne Dinsmore giving information on breeds. Horse & Mule Association, 407 S. Dearborn St., Chicago. Price 25 cents.

From Hand to Mouth.—Basic health considerations in handling food in eating places. Community Health Series No. 3. U. S. Public Health Service, Washington, D. C.

Locker Plants.—How to Build and Operate a Locker Plant, by Albert Todorof, 224 pages, 170 illustrations. Meat Merchandising, St. Louis, Mo. Price $3.00.

Poisonous Plants.—Native and naturalized plants of Virginia with special reference to live stock poisoning, Bul. 36, Virginia Polytechnic Inst., Blacksburg.

Gastric Ulcer in Man and Animals.—Reprint of a paper presented at a meeting of the Chicago Veterinary Society by Donald Cook, M.D., Lake Zurich, Ill.

Technics of Fish Pond Management.—A discussion of the whole subject of raising fish in ponds. Miscellaneous publication 528, U. S. Dept. Agr., Washington, D. C.

Eating and Drinking Establishments.—Pamphlet by the U. S. Public Health Service (Washington, D. C.), containing recommendations for sanitary control of restaurants, taverns, soda fountains, etc. Pub. H. Bul. No. 280.

Any book reviewed in these pages, or any other book if available, may be obtained by remitting the published price to VETERINARY MEDICINE, 7632 S. Crandon Ave., Chicago 49. Bulletins and Circulars should be requested direct from the address given in the notice. Generally they are supplied free unless a price is stated.

Fifteenth Report on Lend-Lease.—A report to the Congress on Lend-Lease operations for the period ending March 31, 1944, with a recapitulation of these operations since March 31, 1941. Supt. of Documents, Washington 25, D. C. Price 30 cents.

Test of Legume Cultures.—Results of tests of forty commercial cultures of nitrifying bacteria. Each culture was tried on alfalfa, clover, cowpeas, lespedeza, soybeans and vetch. Cir. 703, Office of War Information, U. S. Dept. Agri., Washington, D. C.

Hog-Housing.—A description of the fundamentals of hog housing, primarily with the needs as to space, warmth, shade, sunshine, water, ventilation and freedom from pests of the animals, and with recommendations for buildings, pens and dipping vats. Cir. 701. Office of War Information, U. S. Department of Agriculture, Washington, D. C.

Sarcosporidia in Animals.—A summary of the available knowledge on the economic importance of sarcosporidiosis. It is the author's view that the condition is more common than is suspected and that some cases of lameness, weakness, anemia, emaciation, paralysis and death due to sarcosporidia are attributed to other causes. Bul. 262, Wyoming Agr. Exp. Sta., Laramie.

Physical Medicine.—Report of the Baruch Committee on physical medicine by Ray Lyman Wibur, chairman. A survey of the present facilities for teaching and practicing physical therapy and of the present and future need for physicians especially trained in the science of physical medicine and for physical therapy technicians with recommendations. (For the carrying out of these recommendations Mr. Baruch has since donated $1,100,000.)—Baruch Committee on Physical Medicine, 597 Madison Ave., New York 22, N. Y.